

SENDER WILL CHECK CLASSIFICATION TOP AND BOTTOM			
<input type="checkbox"/>	UNCLASSIFIED	<input type="checkbox"/>	CONFIDENTIAL
<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	SECRET
OFFICIAL ROUTING SLIP			
TO	NAME AND ADDRESS	DATE	INITIALS
1	<i>File Unit</i>		
2			
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<input type="checkbox"/>	ACTION	<input type="checkbox"/>	DIRECT REPLY
<input type="checkbox"/>	APPROVAL	<input type="checkbox"/>	DISPATCH
<input type="checkbox"/>	COMMENT	<input type="checkbox"/>	FILE
<input type="checkbox"/>	CONCURRENCE	<input type="checkbox"/>	INFORMATION
<input type="checkbox"/>		<input type="checkbox"/>	PREPARE REPLY
<input type="checkbox"/>		<input type="checkbox"/>	RECOMMENDATION
<input type="checkbox"/>		<input type="checkbox"/>	RETURN
<input type="checkbox"/>		<input type="checkbox"/>	SIGNATURE
Remarks: <i>Please file near or with Job File</i> <i>Thanks</i>			
FOLD HERE TO RETURN TO SENDER			
FROM: NAME, ADDRESS AND PHONE NO.			DATE
<i>WS</i>			<i>4/1</i>
<input type="checkbox"/>	UNCLASSIFIED	<input type="checkbox"/>	CONFIDENTIAL
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FORM NO. 1-67

237

Use previous editions

(40)

MEMORANDUM FOR:

*Treat this as
SECRET*

*as long as it is in
an Agency Building*

RGW 4/1/70
(DATE)

Job No 202-69

FORM NO. 101 REPLACES FORM 10-101
1 AUG 54 WHICH MAY BE USED.

(47)

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Approved For Release 2000/06/07 : CIA-RDP78-06505A000700150003-1

Next 1 Page(s) In Document Exempt

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CONTRACT DOCUMENTS

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PART 1A
INVITATION FOR BIDS

1A.1 INVITATION: [REDACTED]

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[REDACTED] invites Bidders from Contracting Firms to participate in the Bidding for the Project "Air Conditioning [REDACTED]", to be constructed in [REDACTED] and consisting generally of the following items: 25X1C

- a. Procurement and installation of air conditioning plant and equipment including controls.
- b. Procurement, fabrication and installation of all other materials and items, such as air intakes and outlets, ductwork, piping and fittings, miscellaneous metal and other items.
- c. Construction of concrete pads and bases for equipment, including authorized changes and modifications to existing structure for installation of equipment.
- d. Procurement and installation of all electrical items, devices, appliances, wiring and conduit, and others, including connections to existing facilities.
- e. Procurement, erection and installation of suspended ceiling, including acoustic tile and accessories.

Contractors should have had previous experience in the execution of works of a similar nature and only such Contractors should apply for the Contract Documents. The Contract Documents and Drawings may be inspected and purchased at the following office:

1A.2 INSTRUCTIONS TO BIDDERS:

- a. The price of a complete set of Contract Documents (one copy of Documents and one copy of Drawings) is _____ [REDACTED] which is not refundable. Prospective Bidders purchasing Contract Documents shall 25X1A

notify the Contracting Officer [REDACTED] within 10 days of the purchase, of their intention to participate.

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b. Bidders will be required to furnish complete Bids. Incomplete Bids will be disregarded.

c. The Bid must be accompanied by a Bid Guarantee in the amount of 10% of the Total Bid Price, covered by a letter of guarantee from an approved Bank or Surety.

d. Bids must be submitted in sealed envelopes marked and addressed as shown hereinbelow, on or before noon local time _____ 1969, together with a letter under separate cover indicating the capabilities of the firm, current capacity, methods and procedures proposed for executing this project, key personnel, last financial statement, manufacturers' whose equipment they propose furnishing for this project, and articles of associations contemplated for this project. The [REDACTED] does not bind itself to accept the lowest or any Bid.

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Bid for: Air Conditioning [REDACTED]

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To:

e. Bids must be submitted on the enclosed Bid Form. All blank spaces must be filled in. The Total Bid Price must be written in words and figures. If there is a discrepancy between the two, the words shall govern. The Bid must bear the written signature of the Bidder. If the Bidder is an individual doing business under a name other than his own, the Bid shall so state, giving the address of the individual. If the Bidder is a partnership, the Bid shall so state setting forth the names and addresses of all partners and must be signed by a partner designated as such. If the Bidder is a corporation, the Bid shall bear the seal of the corporation and must be signed by a duly authorized officer or agent of such corporation. If the Bidder is a joint venture, the Bid must be signed by a person authorized by each member of the joint venture to sign.

f. Bids shall be valid for a period of 90 (ninety) calendar days after the final time for submission. If the Contract is awarded before

that period has expired, the Bid Guarantee will be returned within 30 (thirty) days of the making of such an award.

g. Each Contractor submitting a Bid shall visit the Project Site and become acquainted with all conditions thereon. Bidders shall take into consideration all such conditions as may affect the Project Work.

h. The Bidder whose Bid is accepted will be required to be immediately responsible for the Project from the time of the signing of the Contract.

i. Should Bidders find during examination of the Contract Documents or after visiting the Project Site, any discrepancies, omissions, ambiguities, or other conflicts in or among any of the Contract Documents to be in doubt as to their meaning, the Bidder should bring question or questions to the attention of the Contracting Officer [REDACTED]. These questions shall be submitted in writing, and in English to be received not later than 7 (seven) days before the Bids are due. Answers in English will be sent in writing to all registered Bidders. Telephone questions will not be considered.

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j. The [REDACTED] reserves the right to open the Bids privately and unannounced after the final date set for the receipt of Bids. The right is also reserved to reject any or all Bids without explanation.

k. If a Bidder intends to use any subcontractors on any part of the work under the Contract, these subcontractors must be indicated in the Bid and are subject to the approval of the Contracting Officer.

PART 1B

BID FORM

1B.1 SUPPLEMENTARY INSTRUCTIONS:

- a. Bid Form shall be completed in ink or typewritten.
- b. Form shall be kept clean and neat. Crossing out will not be acceptable.
- c. Total Bid Price figure shall be confirmed by words as per example: [REDACTED] (Numerals) 50,000 (Written) Fifty thousand.
- d. Great care shall be exercised to make sure that figures are correct and that names of Firms and their addresses are correctly filled in on the Bid Form.

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1B.2 STATEMENT: The Undersigned hereby states that he or his representative has visited the Project Site and has acquainted himself with all conditions affecting the work and that he has examined the Contract Documents consisting of the Invitation for Bids, Bid Form, Contract Agreement, General Provisions, List of Drawings and Drawings, and the Specifications.

1B.3 TOTAL BID PRICE: Having done these things, the Undersigned proposes to furnish all plant, labor, materials, equipment, tools, and other devices required for completion of the Work outlined in the above mentioned Contract Documents for the Project "Air Conditioning [REDACTED]", for the lump sum figures comprising the Total Bid Price as set forth by the Undersigned in the Bid Form hereinafter.

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1B.4 COMPLETION OF WORK: The Undersigned agrees that if awarded the Contract to commence work within 30 (thirty) calendar days of being awarded the Contract, and to complete substantially the work within _____ calendar days.

BID FORM

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The Undersigned hereby proposes to furnish all plant, labor, materials, equipment, tools and other devices, and to perform all work required for construction and installation of the Project "Air Conditioning [REDACTED] complete in place, for the lump sum prices set forth below, including all provisional sums and contingencies, overhead and profit.

<u>Item</u>	<u>Description</u>	<u>Proposed Price</u> [REDACTED]
1.	Air Conditioning Plant and Equipment, complete, in place, including controls, refrigerant piping, and all other items required.	_____
2.	Ductwork, complete, in place, including stiffeners, hangers and supports, air inlets and outlets, insulation, and all other items required.	_____
3.	Electrical Work, complete, in place, including lighting fixtures and lamps, wiring and conduit, switches and other disconnect means, grounding, connections to existing work, and all other items required.	_____
4.	Suspended Ceiling, complete, in place, including acoustic tile.	_____

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<u>Item</u>	<u>Description</u>	<u>Proposed Price</u>	
		██████████	25X1A
5.	Testing and Adjusting System, complete, including the furnishing of instruments, tools and labor required.		

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TOTAL BID PRICE ██████████ (Numerals)

(Written) _____

NAME OF FIRM _____

ADDRESS _____

DATE _____

SIGNED BY _____

PART 1C

CONTRACT AGREEMENT

PROJECT

AIR CONDITIONING [REDACTED]

25X1C

This agreement has been made and entered into at [REDACTED] on 25X1A
the _____ day of _____,
25X1C between the [REDACTED] represented
by _____
_____ the party of the first part, herein-
25X1C after called [REDACTED] and _____
_____ represented in this Contract by _____
_____ the party of the second part, hereinafter called the
"Contractor".

PREAMBLE:

25X1C Whereas the [REDACTED] 25X1C
invited Bidders for the execution of the Project Air Conditioning [REDACTED] 25X1C
[REDACTED] in accordance with the Bid Form, the General
Provisions, the Drawings and the Specifications attached hereto and the
Bid offered by the Contractor was the lowest of the Bids offered for the
execution of this Project; the Contractor offered to execute the Work
covered by the above mentioned Contract Documents for the following
amount: _____
_____, and

Whereas, the second party agrees to execute the Work set forth in
the Bid Form, the General Provisions, the Drawings and the Specifications
attached hereto within a period of _____
calendar days, the parties hereto covenant and agree as follows:

CLAUSE I:

The Contractor, party of the second part, agrees to execute all work
shown under the Bid Form, the General Provisions, the Drawings and Speci-
fications accompanying this agreement and constituting an integral part of

it. Such work shall include the supply of all plant, equipment, tools, labor and materials and the execution of all work described in the Contract Documents for the Project Air Conditioning [REDACTED]

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CLAUSE II:

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[REDACTED] party of the first part, agrees to pay to the second party for his execution of the work referred in Clause I of this agreement a sum of _____

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as provided for in his Bid Form, General Provisions, Drawings and Specifications pertinent to this work. Payment shall be made by a Letter of Credit to be established by [REDACTED] with _____

CLAUSE III:

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[REDACTED] party of the first part, undertakes to establish an irrevocable and divisible Letter of Credit with the _____

_____ in the sum of _____

in favor of the second party and valid for _____ months. From the amount of this Letter of Credit, the Contractor should be paid the amounts due to him under Clause II of this Contract against certificates signed by the Contracting Officer or by any person appointed by [REDACTED] for this purpose, certifying that the Contractor, party of the second part, is entitled to the amount shown on the certificate. [REDACTED] shall furnish the bank with a specimen of the signature of the person who may so be appointed.

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CLAUSE IV:

The second party undertakes to complete the work described in Clause I of this Contract within a period of _____ calendar days, provided that he shall commence the work within thirty (30) days of the date of signing this Contract.

This Contract has been made in duplicate and signed by the parties hereto, each of them having received one copy.

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CONTRACTOR

by _____

by _____

PART 1D

GENERAL PROVISIONS

1D.1 DEFINITIONS:

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b. The term "Contracting Officer" as used herein means the person executing this Contract on behalf of [REDACTED] and includes a duly appointed successor or authorized representative.

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c. The term "Contractor" as used herein means the person, persons, firms or company whose Bid has been accepted by [REDACTED] and their duly authorized representatives.

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d. "Contract Documents" consist of the Invitation for Bids, Bid Form, Contract Agreement, General Provisions, List of Drawings and Drawings, Specifications, and including all changes thereof incorporated in the Contract Documents before execution of the Contract.

e. The term "the Work" as used herein means all work shown on the Drawings, described in the Bid Form and in the Specifications and all things to be performed, supplied, done or undertaken by the Contractor under the Contract, and includes:

(1) Permanent Work, i.e., work which shall be incorporated in and form part of the work turned over to [REDACTED] upon completion of the Contract.

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(2) Temporary Work, i.e., all temporary work, other than permanent work as above defined, as may be deemed necessary by the Contracting Officer and/or the Contractor, to construct, complete and maintain the Work and includes (without thereby limiting the foregoing definition) all temporary offices, shops, storage areas, erections, enclosures, planking and the like.

f. The term "plant" as used herein means and includes, but is not limited to, all equipment, cranes, engines, pumps, concrete mixers, winches, compressors, chains, cables, ropes, molds, templates, scaffolding, implements and all appliances and accessories required to construct, complete, and maintain the Work.

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g. The "Total Bid Price" means the total amount of the Contract including all provisional sums and contingencies, overhead and profit payable under the Contract by [REDACTED] to the Contractor for the full and entire completion of the Work under this Contract.

h. Reference to known Standards and Specifications shall mean and intend the latest edition adopted and published at date of invitation for submitting Bids.

i. Wherever in the Specifications or upon the Drawings the words "directed", "required", "ordered", "designated", "prescribed", or words of like import are used, it shall be understood that the "direction", "requirement", "order", "designation", or "prescription" of the Contracting Officer is intended, and similarly the words "approved", "acceptable", "satisfactory", or words of like import shall mean "approved by", or "acceptable to" or "satisfactory to" the Contracting Officer, unless otherwise expressly stated.

j. Where "as shown", "as indicated", "as detailed", or words of similar import are used, it shall be understood that the reference is made to the Drawings unless stated otherwise. The word "provided" as used herein shall be understood to mean "provided complete in place", that is "furnished and installed".

1D.2 CORRESPONDENCE:

a. For purposes of this Contract all correspondence shall be addressed to _____

_____ The Contractor shall conduct all correspondence in connection with this Contract in English.

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b. All notices and other communications shall be deemed to be validly served for the purposes of this Contract if they are delivered by hand to the above stated address for [REDACTED] address for the Contractor, or if they are sent to the addresses thereof by registered post. Both [REDACTED] and the Contractor hereby waive the right of being served with notices in connection with this Contract through the Notary Public.

1D.3 PERFORMANCE GUARANTEE: Within thirty (30) calendar days from the date of signing the Contract, the Contractor shall furnish the Contracting Officer a bank letter of guarantee for the performance of the Work.

The bank letter of guarantee shall be furnished in a form acceptable to the Contracting Officer and shall be in the amount of ten percent (10%) of the Total Bid Price. The letter of guarantee shall be dated as of the Contract date, and shall state that it will continue in effect until the Work has been finally inspected and accepted by the Contracting Officer, and that thereafter it will continue in effect until expiration of any equipment guarantee period specified in the guarantee clauses of the Specifications in an amount equal to five percent (5%) of the Total Bid Price or twice the total invoice price of all items of equipment so identified in those clauses, whichever is the lesser amount. The letter of guarantee shall also state that the bank agrees and consents that the Contract may be modified by change order or supplemental agreement without affecting the validity of the letter of guarantee.

1D.4 SPECIFICATIONS AND DRAWINGS:

a. The Contractor shall keep on the work a copy of the Drawings and Specifications and shall at all times give the Contracting Officer access thereto. Anything mentioned in the Specifications and not shown on the Drawings, or shown on the Drawings and not mentioned in the Specifications, shall be of like effect as if shown or mentioned in both. In case of difference between the Drawings and Specifications, the Specifications shall govern. In case of discrepancy either in the figures, in the Drawings, or in the Specifications, the matter shall be promptly submitted to the Contracting Officer, who shall promptly make a determination in writing. Any adjustment by the Contractor without such a determination shall be at his own risk and expense. The Contracting Officer shall furnish from time to time such detail Drawings and other information as he may consider necessary, unless otherwise provided.

b. Omissions and Misdescriptions: Omissions from the Drawings or Specifications or the misdescription of details of work which are manifestly necessary to carry out the intent of the Drawings and Specifications, or which are customarily performed, shall not relieve the Contractor from performing such omitted or misdescribed details of work but they shall be performed as if fully and correctly set forth and described in the Drawings and Specifications.

c. Checking of Drawings and Dimensions: The Contractor shall check all Drawings furnished him immediately upon their receipt and shall promptly notify the Contracting Officer of any discrepancies. Figures marked on Drawings shall in general be followed in preference to scale measurements. Large scale Drawings shall in general govern small scale Drawings. The Contractor shall compare all Drawings and verify the figures

before laying out the work and be responsible for any errors which might have been avoided thereby. When measurements are affected by conditions already established, the Contractor shall take measurements notwithstanding the giving of scale or figure dimensions in the Drawings.

d. Deviations: Deviations from the Drawings and dimensions therein given, whether or not error is believed to exist, shall be made only after written authority is obtained from the Contracting Officer.

1D.5 CHANGES:

a. The Contracting Officer may, at any time, without notice to the sureties, by written order designated or indicated to be a change order, make any change in the work within the general scope of the Contract, including but not limited to changes:

- (1) In the Specifications (including Drawings and designs);
- (2) In the method or manner of performance of the work; or
- (3) Directing acceleration in the performance of the work.

b. Any other written order or an oral order (which term as used in this paragraph shall include direction, instruction, interpretation or determination) from the Contracting Officer, which causes any such change, shall be treated as a change order under this clause, provided that the Contractor gives the Contracting Officer written notice stating the date, circumstances, and source of the order and that the Contractor regards the order as a change order.

c. Except as herein provided, no order, statement, or conduct of the Contracting Officer shall be treated as a change under this clause or entitle the Contractor to an equitable adjustment hereunder.

d. If any change under this clause causes an increase or decrease in the Contractor's cost of, or the time required for, the performance of any part of the work under this contract, whether or not changed by any order, an equitable adjustment shall be made and the contract modified in writing accordingly; provided, however, that except for claims based on defective Specifications, no claim for any change under b. above shall be allowed for any costs incurred more than 20 days before the Contractor gives written notice as therein required: And provided further, that in the case of defective Specifications for which [REDACTED] is

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responsible, the equitable adjustment shall include any increased costs reasonably incurred by the Contractor in attempting to comply with such defective Specifications.

25X1C e. If the Contractor intends to assert a claim for an equitable adjustment under this clause, he must, within 30 days after receipt of a written change order under a. above or the furnishing of a written notice under b. above, submit to the Contracting Officer a written statement setting forth the general nature and monetary extent of such claim, unless this period is extended by [REDACTED]. The statement of claim hereunder may be included in the notice under b. above.

f. No claim by the Contractor for an equitable adjustment hereunder shall be allowed if asserted after final payment under this contract.

1D.6 TERMINATION FOR DEFAULT - DAMAGES FOR DELAY - TIME EXTENSIONS:

25X1C a. If the Contractor refuses or fails to prosecute the work, or any separable part thereof, with such diligence as will insure its completion within the time specified in this contract, or any extension thereof, or fails to complete said work within such time, [REDACTED] by written notice to the Contractor, terminate his right to proceed with the work or such part of the work as to which there has been delay. In such event the 25X1C [REDACTED] take over the work and prosecute the same to completion, by contract or otherwise, and may take possession of and utilize in completing the work such materials, appliances, and plant as may be on the site of the work and necessary therefor. Whether or not the Contractor's right to proceed with the work is terminated, he and his sureties shall be liable 25X1C for any damage to [REDACTED] resulting from his refusal or failure to complete the work within the specified time.

25X1C b. If fixed and agreed liquidated damages are provided in the contract and if [REDACTED] so terminates the Contractor's right to proceed, the resulting damage will consist of such liquidated damages until such 25X1C reasonable time as may be required for final completion of the work together with any increased costs occasioned [REDACTED] in completing the work.

25X1C c. If fixed and agreed liquidated damages are provided in the contract and if [REDACTED] does not so terminate the Contractor's right to proceed, the resulting damage will consist of such liquidated damages until the work is completed or accepted.

d. The Contractor's right to proceed shall not be so terminated nor the Contractor charged with resulting damage if:

(1) The delay in the completion of the work arises from causes other than normal weather beyond the control and without the fault or negligence of the Contractor, including but not restricted to acts of God, acts of the public enemy, acts of [REDACTED] in its contractual capacity, acts of another Contractor in the performance of a contract with [REDACTED] fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, unusually severe weather, or delays of subcontractors or suppliers arising from causes other than normal weather beyond the control and without the fault or negligence of both the Contractor and such subcontractors or suppliers;

(2) The Contractor, within 10 days from the beginning of any such delay (unless the Contracting Officer grants a further period of time before the date of final payment under the contract), notifies the Contracting Officer in writing of the causes of delay. The Contracting Officer shall ascertain the facts and the extent of the delay and extend the time for completing the work when, in his judgment, the findings of fact justify such an extension, and his findings of fact shall be final and conclusive on the parties, subject only to appeal as provided in paragraph DISPUTES hereinafter. As used in paragraph (1) above, the term "subcontractors or suppliers" means subcontractors and suppliers at any tier.

e. If, after notice of termination of the Contractor's right to proceed under the provisions of this clause, it is determined for any reason that the Contractor was not in default under the provisions of this clause, or that the delay was excusable under the provisions of this clause, the contract shall be equitably adjusted to compensate for such termination and the contract modified accordingly; failure to agree to any such adjustment shall be a dispute concerning a question of fact within the meaning of the paragraph of this contract entitled DISPUTES.

f. The rights and remedies of [REDACTED] provided in this clause are in addition to any other rights and remedies provided by law or under this contract.

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1D.7 DISPUTES: Except as otherwise provided in this contract, any dispute concerning a question of fact arising under this contract which is not disposed of by agreement shall be decided by the Contracting Officer, who shall reduce his decision to writing and mail or otherwise furnish a copy thereof to the Contractor. The decision of the Contracting Officer shall be final and conclusive.

1D.8 PAYMENTS TO CONTRACTOR:

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a. [REDACTED] will pay the contract price as hereinafter provided.

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b. [REDACTED] will make progress payments monthly as the work proceeds, or at more frequent intervals as determined by the Contracting Officer, on estimates approved by the Contracting Officer. If requested by the Contracting Officer, the Contractor shall furnish a breakdown of the total contract price showing the amount included therein for each principal category of the work, in such details as required, to provide a basis for determining progress payments. In the preparation of estimates the Contracting Officer, at his discretion, may authorize material delivered on the site and preparatory work done to be taken into consideration. Material delivered to the Contractor at locations other than the site may also be taken into consideration (1) if such consideration is specifically authorized by the contract and (2) if the Contractor furnishes satisfactory evidence that he has acquired title to such material and that it will be utilized on the work covered by this contract. Such payments shall be made on submission of itemized requests by the Contractor and shall be subject to reduction for overpayments or increase for underpayments on preceding payments to the Contractor.

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c. In making such progress payments, there shall be retained 10 percent of the estimated amount until final completion and acceptance of the contract work. However, if the Contracting Officer, at any time after 50 percent of the work has been completed, finds that satisfactory progress is being made, he may authorize any of the remaining progress payments to be made in full. Also, whenever the work is substantially complete, the Contracting Officer, if he considers the amount retained to be in excess of the amount adequate for the protection of [REDACTED] at his discretion, may release to the Contractor all or a portion of such excess amount.

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d. All material and work covered by progress payments made shall thereupon become the sole property [REDACTED] but this provision

shall not be construed as relieving the Contractor from the sole responsibility for all material and work upon which payments have been made, or the restoration of any damaged work, or as waiving the right of [REDACTED] to require the fulfillment of all of the terms of the contract.

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e. Upon completion and acceptance of all work, the amount due the Contractor under this contract shall be paid upon the presentation of a properly executed voucher and after the Contractor shall have furnished [REDACTED] with a release for all claims against [REDACTED] arising by virtue of this contract, other than claims in stated amounts as may be specifically excepted by the Contractor from the operation of the release.

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f. The obligation of [REDACTED] to make any of the payments required under any of the provisions of this contract (including those of "Termination for Default - Damages for Delay - Time Extensions" and "Termination for Convenience [REDACTED]") shall, in the discretion of the Contracting Officer, be subject to (1) reasonable deductions on account of defects in material or workmanship, and (2) any claims which [REDACTED] may have against the Contractor under or in connection with this contract. Any overpayments to the Contractor shall, unless otherwise adjusted, be repaid to [REDACTED] upon demand.

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1D.9 MATERIAL AND WORKMANSHIP:

a. Unless otherwise specifically provided in this contract, all equipment, material, and articles incorporated in the work covered by this contract are to be new and of the most suitable grade for the purpose intended. All equipment shall be of U.S.A. manufacture unless otherwise approved. Unless otherwise specifically provided in this contract, reference to any equipment, material, article, or patented process, by trade name, make, or catalog number, shall be regarded as establishing a standard of quality and shall not be construed as limiting competition, and the Contractor may, at his option, use any equipment, material, article, or process which, in the judgement of the Contracting Officer, is equal to that named. The Contractor shall furnish to the Contracting Officer for his approval the name of the manufacturer, the model number, and other identifying data and information respecting the performance, capacity, nature, and rating of the machinery and mechanical and other equipment which the Contractor contemplates incorporating in the work. When required by this contract or when called for by the Contracting Officer, the Contractor shall furnish the Contracting Officer for approval full information

concerning the material or articles which he contemplates incorporating in the work. When so directed, samples shall be submitted for approval at the Contractor's expense, with all shipping charges prepaid. Machinery, equipment, material, and articles installed or used without required approval shall be at the risk of subsequent rejection.

b. All work under this contract shall be performed in a skillful and workmanlike manner. The Contracting Officer may, in writing, require the Contractor to remove from the work any employee the Contracting Officer deems incompetent, careless, or otherwise objectionable.

1D.10 CONTRACTOR INSPECTION SYSTEM: The Contractor shall maintain an adequate inspection system and perform such inspections as will assure that the work performed under the contract conforms to contract requirements, and shall maintain and make available [REDACTED] adequate records of such inspections.

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1D.11 INSPECTION AND ACCEPTANCE:

a. Except as otherwise provided in this contract, inspection and test by the Contracting Officer of material and workmanship required by this contract shall be made at reasonable times and at the site of the work, unless the Contracting Officer determines that such inspection or test of material which is to be incorporated in the work shall be made at the place of production, manufacture, or shipment of such material. To the extent specified by the Contracting Officer at the time of determining to make off-site inspection, or test, such inspection or test shall be conclusive as to whether the material involved conform to the contract requirements. Such off-site inspection or test shall not relieve the Contractor of responsibility for damage to or loss of the material prior to acceptance, nor in any way affect the continuing rights of [REDACTED] after acceptance of the completed work under the terms of paragraph f. hereinafter, except as hereinabove provided.

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b. The Contractor shall, without charge, replace any material or correct any workmanship found [REDACTED] not to conform to the contract requirements, unless in the public interest [REDACTED] consents to accept such material or workmanship with an appropriate adjustment in contract price. The Contractor shall promptly segregate and remove rejected material from the premises.

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c. If the Contractor does not promptly replace rejected material or correct rejected workmanship, [REDACTED] may by contract or otherwise, replace such material or correct such workmanship and charge the cost thereof to the Contractor, or terminate the Contractor's right to proceed in accordance with the paragraph of this contract entitled "Termination for Default - Damages for Delay - Time Extensions".

d. The Contractor shall furnish promptly, without additional charge, all facilities, labor, and material reasonably needed for performing such safe and convenient inspection and test as may be required by the Contracting Officer. The Contractor shall be charged with any additional cost of inspection when material and workmanship are not ready at the time specified by the Contractor for its inspection.

e. Should it be considered necessary or advisable by the Contracting Officer at any time before acceptance of the entire work to make an examination of work already completed, by removing or tearing out same, the Contractor shall, on request, promptly furnish all necessary facilities, labor, and material. If such work is found to be defective or nonconforming in any material respect, due to the fault of the Contractor or his subcontractors, he shall defray all the expenses of such examination and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the contract, an equitable adjustment shall be made in the contract price to compensate the Contractor for the additional services involved in such examination and reconstruction, and if completion of the work has been delayed thereby, he shall, in addition, be granted a suitable extension of time.

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f. Unless otherwise provided in this contract, acceptance by [REDACTED] shall be made as promptly as practicable after completion and inspection of all work required by this contract. Acceptance shall be final and conclusive except as regards latent defects, fraud, or such gross mistakes as may amount to fraud or as regards [REDACTED] rights under any warranty or guarantee.

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g. Upon completion of mechanical and electrical installations, the systems will be placed in operation by the Contractor who shall demonstrate that the entire installation complies with all the requirements of the contract. Tests shall be performed under the direction of a qualified engineer and subject to the approval of the Contracting Officer. All labor, transportation, materials, equipment, apparatus and items necessary to perform tests shall be for the Contractor's account and shall be included

in the bid price. No extra payment will be made for cost incurred in testing and placing in operation. All installation defects disclosed by the tests shall be rectified without additional cost [REDACTED]

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1D.12 SUPERINTENDENCE BY CONTRACTOR: The Contractor shall give his personal superintendence to the work or have a competent foreman or superintendent, satisfactory to the Contracting Officer, on the work at all times during progress, with authority to act for him.

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1D.13 PERMITS AND RESPONSIBILITIES: The Contractor shall, without additional expense [REDACTED] be responsible for obtaining any necessary licenses and permits, and for complying with any applicable laws, codes, and regulations, in connection with the prosecution of the work. He shall be similarly responsible for all damages to persons or property that occur as a result of his fault or negligence. He shall take proper safety and health precautions to protect the work, the workers, the public, and the property of others. The Contractor shall, without additional cost [REDACTED] replace materials and effect reconstruction of the works or project, if they should be lost, damaged or destroyed, regardless of whether such loss, damage or destruction was caused by the Contractor's fault or neglect, acts of God, or any cause whatsoever, until completion and acceptance of the entire work, except for any completed part thereof which has already been accepted.

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1D.14 CONDITIONS AFFECTING THE WORK: The Contractor shall be responsible for having taken steps reasonably necessary to ascertain the nature and location of the work, and the general and local conditions which can affect the work or the cost thereof. Any failure by the Contractor to do so will not relieve him from responsibility for successfully performing the work without additional expense [REDACTED] assumes no responsibility for any understanding or representations concerning conditions made by any of its officers or agents prior to the execution of this contract, unless such understanding or representations by [REDACTED] are expressly stated in the contract.

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1D.15 OTHER CONTRACTS: [REDACTED] may undertake or award other contracts for additional work, and the Contractor shall fully cooperate with such other contractors [REDACTED] employees and carefully fit his own work to such additional work as may be directed by the Contracting Officer. The Contractor shall not commit or permit any act which will interfere with the performance of work by any other contractor or by [REDACTED]

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1D.16 PATENTS: The Contractor shall hold [REDACTED] harmless from liability of any kind on account of any patented or unpatented invention, article, or appliance manufactured or used in the performance of this contract.

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1D.17 TAXES:

a. The Contractor warrants that the contract price, including the prices in subcontracts hereunder, does not include any tax, similar charge or duty which the Government of the United States and the Contractor's Government have agreed shall not be applicable to expenditures made by the [REDACTED] in the Contractor's country, or any tax, similar charge or duty from which the Contractor, or any subcontractor hereunder, is exempt under the laws of the Contractor's country. If any such tax, similar charge or duty has been included in the contract price through error or otherwise, the contract price shall be correspondingly reduced.

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b. If for any reason after the contract date the Contractor is relieved in whole or in part from the payment or the burden of any tax, similar charge or duty included in the contract price, the contract price shall be correspondingly reduced.

1D.18 SHOP DRAWINGS: The Contractor shall submit to the Contracting Officer for approval six copies of all shop drawings as called for under the Specifications. These drawings shall be complete and detailed. If approved by the Contracting Officer, each copy of the drawings will be identified as having received such approval by being so stamped and dated. The Contractor shall make any corrections required by the Contracting Officer. If the Contractor considers any correction indicated on the shop drawings to constitute a change to the contract Drawings or Specifications, notice as required under paragraph CHANGES hereinbefore will be given to the Contracting Officer. Five sets of all shop drawings will be retained by the Contracting Officer and one set will be returned to the Contractor. The approval of the shop drawings by the Contracting Officer shall not be construed as a complete check, but will indicate only that the general method of construction and detailing is satisfactory. Approval of such drawings will not relieve the Contractor of the responsibility for any error which may exist as the Contractor shall be responsible for the dimensions and design of adequate connections, details, and satisfactory construction of all work.

REMARKS: <u>AC. PUILTS</u> <u>SHOP DRAWINGS</u>		
FROM:		
ROOM NO.	BUILDING	EXTENSION
FORM NO. 241 1 FEB 55		REPLACES FORM 36-8 WHICH MAY BE USED.

(47)

a. Upon the completion of the work under this contract, the Contractor shall furnish two complete sets of prints of all shop drawings as finally approved. These drawings shall show changes and revisions made up to the time the work is completed and accepted.

1D.19 AS-BUILT DRAWINGS: The Contractor shall be furnished two sets of full-sized prints which shall be marked-up and, upon completion of the work, shall be returned to the Contracting Officer, showing any changes, additions, corrections or modifications to the contract Drawings. When it is impractical to show by Drawings certain features as constructed, a general statement on the Drawings will be required to describe the deviations and departures from the contract Drawings and Specifications. These marked-up Drawings and complementary notes will show actual as-built conditions. The sets of said Drawings shall be kept up-to-date during the progress of the work. The Contractor will maintain a file of Contracting Officer directives, letters, orders, signed memoranda or other written instructions authorizing or ordering these various deviations from originally planned construction. Maintenance of as-built Drawings will be periodically reviewed by the Contracting Officer to insure proper, prompt and correct recording of all deviations of any form whatsoever.

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1D.20 SECURITY REQUIREMENTS AT SITE: The Contractor shall determine from the cognizant [REDACTED] authority the security requirements applicable to Contractor personnel to be assigned and used in this work. The Contractor will be responsible for compliance with the security rules [REDACTED] and shall include any expense connected with such requirements in his bid price. All expense connected with compliance with site security shall be at the Contractor's expense.

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1D.21 USE AND POSSESSION PRIOR TO COMPLETION: [REDACTED] shall have the right to take possession of or use any completed or partially completed part of the work. Such possession or use shall not be deemed an acceptance of any work not completed in accordance with the contract. While the [REDACTED] in such possession, the Contractor shall be relieved of the responsibility for loss or damage to the work other than that resulting from the Contractor's fault or negligence. If such prior possession or use by [REDACTED] delays the progress of the work or causes additional expense to the Contractor, an equitable adjustment in the contract price or the time of completion will be made and the contract shall be modified in writing accordingly.

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1D.22 CLEANING UP: The Contractor shall at all times keep the construction area, including storage areas used by him, free from accumulations of waste materials or rubbish and prior to completion of the work remove any rubbish from the premises and all tools, scaffolding, equipment, and materials not the property [REDACTED]. Upon completion of the work the Contractor shall leave the work and premises in a clean, neat and workmanlike condition satisfactory to the Contracting Officer.

1D.23 ACCIDENT PREVENTION:

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a. The Contractor and his subcontractors shall comply with all local laws pertaining to safety and accident prevention while performing work under this contract. In addition, the Contractor and his subcontractors shall take such other steps as may reasonably be required by [REDACTED] for the purpose of promoting safety and accident prevention.

b. The Contractor and his subcontractors will maintain an accurate record of and will report to the Contracting Officer in the manner and on the forms prescribed by the Contracting Officer, exposure data and all accidents resulting in death, traumatic injury, occupation disease, or damage to property, materials, supplies and equipment incident to work performed under this contract.

c. The Contracting Officer will notify the Contractor of any non-compliance with the foregoing provisions and the action to be taken. The Contractor shall, after receipt of such notice immediately correct the conditions. Such notices, when delivered to the Contractor or his representatives at the site of the work, shall be deemed sufficient for the purpose. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop order shall be made the subject of claim for extension of time or for excess costs or damages to the Contractor.

d. The Contractor will be responsible for insuring that his subcontractors comply with the provisions of this clause.

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1D.24 [REDACTED] The work will be conducted under the general direction of the Contracting Officer and is subject to inspection by his appointed inspectors to insure strict compliance with the terms of the contract. No inspector is authorized to change any provision of the Specifications without written authorization of the Contracting Officer,

nor shall the presence or absence of an inspector relieve the Contractor from any requirements of the contract.

1D.25 SUSPENSION OF WORK:

a. The Contracting Officer may order the Contractor in writing to suspend, delay, or interrupt all or any part of the work for such period of time as he may determine to be appropriate for the convenience of [REDACTED]

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b. If the performance of all or any part of the work is, for an unreasonable period of time, suspended, delayed, or interrupted by an act of the Contracting Officer in the administration of this contract, or by his failure to act within a reasonable time, an adjustment shall be made for any increase in cost of performance of this contract (excluding profit) necessarily caused by such unreasonable suspension, delay, or interruption and the contract modified in writing accordingly. However, no adjustment shall be made under this clause for any suspension, delay, or interruption to the extent that performance would have been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor or for which an equitable adjustment is provided for or excluded under any other provision of this contract.

1D.26 COMMUNIST AREAS:

a. Unless he first obtains the written approval of the Contracting Officer, the Contractor shall not acquire for use in the performance of this contract:

(1) Any supplies or services originating from sources within the following communist areas:

Albania

Bulgaria

China, excluding Taiwan (Formosa), but including

Manchuria, Inner Mongolia, the province of Tsinghai and Sikang, Sinkiang, Tibet, the former Kwantung Leased Territory, the present Port Arthur Naval Base Area, and Lianoning Province

Communist-controlled area of Viet Nam and Communist-controlled area of Laos

Cuba

Czechoslovakia

East Germany (Soviet Zone of Germany and the Soviet
Sector of Berlin)

Estonia

Hungary

Latvia

Lithuania

North Korea

Outer Mongolia

Poland and Danzig

Rumania

Union of Soviet Socialist Republics

(2) Any supplies, however processed, which are or were located in or transported through China (as described in (1) above), North Korea, North Vietnam, or Cuba.

b. The Contractor agrees to insert the provisions of this clause, including this paragraph b., in all subcontracts hereunder.

1D.27 PROGRESS CHARTS AND REQUIREMENTS FOR OVERTIME WORK:

a. The Contractor shall within 5 days or within such time as determined by the Contracting Officer, after date of commencement work, prepare and submit to the Contracting Officer for approval a practicable schedule, showing the order in which the Contractor proposes to carry on the work, the date on which he will start the several salient features (including procurement of materials, plant and equipment) and the contemplated dates for completing the same. The schedule shall be in the form of a progress chart of suitable scale to indicate appropriately the percentage of work scheduled for completion at any time. The Contractor shall enter on the chart the actual progress at such intervals as directed by the Contracting Officer, and shall immediately deliver to the Contracting Officer three copies thereof. If the Contractor fails to submit a progress schedule within the time herein prescribed, the Contracting Officer may withhold approval of progress payment estimates until such time as the Contractor submits the required progress schedule.

b. If, in the opinion of the Contracting Officer, the Contractor falls behind the progress schedule, the Contractor shall take such steps as may be necessary to improve his progress and the Contracting Officer may require him to increase the number of shifts, or overtime operations, days of work, or the amount of construction plant or all of them, and to

submit for approval such supplementary schedule or schedules in chart form as may be deemed necessary to demonstrate the manner in which the agreed rate of progress will be regained, all without additional cost to the

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c. Failure of the Contractor to comply with the requirements of the Contracting Officer under this provision shall be grounds for determination by the Contracting Officer that the Contractor is not prosecuting the work with such diligence as will insure completion within the time specified. Upon such determination the Contracting Officer may terminate the Contractor's right to proceed with the work, or any separable part thereof, in accordance with the clause of the contract entitled "Termination for Default-Damages for Delay-Time Extensions."

d. If the Contractor desires to carry on work outside the regular daily working hours of the Contracting Officer or on Saturdays, Sundays or holidays, he shall submit application to the Contracting Officer but shall allow ample time to enable satisfactory arrangements to be made by [REDACTED] for inspecting the work in progress.

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1D.28 WARRANTY:

a. Except as otherwise expressly provided in this contract, the Contractor warrants all mechanical and electrical equipment to be free from defects of design, material and workmanship, for a period of one year from date of acceptance of the work. The Contractor, promptly after receipt of notice, shall make good at his expense all defects developing during this period. This warranty shall not operate to defer final payment.

b. In addition to his obligations under paragraph a. above and under the clause entitled "Inspection and Acceptance", the Contractor agrees to replace, repair, or otherwise remedy at no cost [REDACTED] any defects in the work arising from materials or workmanship not in conformance with the contract Specifications which are discovered within one year from the [REDACTED] acceptance of the contract work. [REDACTED] agrees to give the Contractor notice of such defects promptly after their discovery and in no event later than one year after final acceptance. This obligation shall not delay final acceptance and final payment for the contract work.

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c. All subcontractors', manufacturers', or suppliers' warranties and guaranties, expressed or implied, respecting any material or equipment used in or a part of the work (whether on equipment of the nature above specified or otherwise) shall be deemed obtained by the Contractor as the [REDACTED] and all such warranties and guaranties shall inure

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to the benefit of [REDACTED] without the necessity of separate transfer or assignment thereof; provided, that if directed by the Contracting Officer, the Contractor shall require such subcontractors, manufacturers, or suppliers to execute such warranties and guaranties in writing to [REDACTED]

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d. The remedies provided for in this clause shall not be restrictive of, but shall be cumulative and in addition to, all other remedies of [REDACTED] in respect of latent defects or fraud.

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PART 1E

LIST OF DRAWINGS

1E.1 CONTRACT DRAWINGS: The following comprise the Contract Drawings for the Project.

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AIR CONDITIONING [REDACTED] DRAWING NO.

<u>Sheet No.</u>	<u>Title</u>
M1 of 4	Air Conditioning Plan
M2 of 4	Roof Plan
M3 of 4	Sections & Details
M1 of 4	Plans & Diagrams

SPECIFICATION 1F

AIR CONDITIONING

1F.1 SCOPE: This Specification covers air conditioning, complete.

1F.2 GENERAL: The Contract Drawings, indicate the extent and general arrangement of the air conditioning system. Equipment, ductwork and piping arrangements shall fit into spaces allotted and shall allow adequate acceptable clearances for installation, replacement, entry, servicing and maintenance.

a. Capacities of all equipment shall be not less than those indicated.

b. Nameplates: Each major component of equipment shall have the manufacturer's name, address and catalog number on a plate securely attached to the item of equipment.

c. Safety Requirements: Belts, pulleys, chains, gears, couplings, projecting setscrews, keys, and other rotating parts located so that any person can come in close proximity thereto shall be fully enclosed or properly guarded. High-temperature equipment and piping so located as to endanger personnel or create a fire hazard shall be properly guarded or covered with insulation.

d. Spare-Parts Data: As soon as practicable after approval of the list of equipment and, if possible, not later than 4 months prior to the date of beneficial occupancy, the Contractor shall furnish spare-parts data for each different item of equipment listed. The data shall include a complete list of parts and supplies, with current unit prices and source of supply; a list of parts and supplies that are either normally furnished at no extra cost with the purchase of the equipment or specified hereinafter to be furnished as part of the Contract, and a list of additional items recommended by the manufacturer to assure efficient operation for a period of 360 days at the particular installation. The foregoing shall not relieve the Contractor of any responsibilities under the guaranty specified hereinafter.

e. Verification of Dimensions: The Contractor shall be responsible for the coordination and proper relation of his work to the

building structure and to the work of all trades. The Contractor shall visit the premises and thoroughly familiarize himself with all details of the work and working conditions, to verify all dimensions in the field, and to advise the Contracting Officer of any discrepancy before performing any work.

f. Performance Data: The Contractor shall submit, with the equipment, all relevant necessary manufacturer's instructions for proper installation, operation and maintenance together with preventive maintenance programs for all major items.

1F.3 MATERIALS AND EQUIPMENT shall conform to the requirements specified hereinafter and shown on the Drawings, and shall be the products of manufacturers regularly engaged in the manufacture of such products. Items of equipment shall essentially duplicate equipment that has been in satisfactory operation for at least 2 years prior to bid opening and shall be supported by a service organization that is, in the opinion of the Contracting Officer, reasonably convenient to the site.

1F.4 MATERIALS AND EQUIPMENT LISTS: As soon as practicable, and before starting installation of any materials or equipment, the Contractor shall submit to the Contracting Officer for approval a complete list, in triplicate, of materials and equipment to be incorporated in the work. This list shall include catalog numbers, cuts, and such other descriptive data as may be required. No consideration will be given to partial lists submitted from time to time. Approval of materials and equipment will be based on the manufacturer's published data. Approval of materials and equipment will be tentative subject to submission of complete shop drawings indicating compliance with the Contract Documents.

1F.5 SHOP DRAWINGS: After receiving tentative approval of the items on the materials and equipment lists, and before installation of any of these items, the Contractor shall submit complete shop drawings and such other descriptive data as the Contracting Officer may require to demonstrate compliance with the Contract Document. Shop drawings shall be submitted for the following items at one time in order to demonstrate that these items of equipment have been properly coordinated and will function properly with each other: Air Conditioning Units, Air filters, Condensing Unit, Equipment Supports, Blast Heating Coils, Controls, Diffusers, Grilles, Insulation, Valves, Specialties and such other items as the Contracting Officer may direct. If departures from the Contract Drawings are deemed necessary by

the Contractor, details of such departures, including changes in related portions of the project and the reasons therefor, shall be submitted with the shop drawings.

1F.6 WORKMANSHIP: All materials and equipment shall be installed in accordance with the approved recommendations of the manufacturer to conform with the Contract Documents. The installation shall be accomplished by workmen skilled in this type of work.

1F.7 ELECTRICAL WORK: Electrical-motor-driven air conditioning equipment shall be provided complete with motors, motor starters, and controls. Electrical characteristics shall be as indicated on Drawings. Motors shall be of sufficient capacity to drive the equipment at the specified capacity without exceeding the nameplate ratings of the motors.

1F.8 AIR CONDITIONING UNIT (MULTIZONE) shall be Blow-Thru type, installed in the location and manner shown on the Drawings. The unit shall include a condensate drain pan, a fan section, a cooling coil section containing a direct expansion cooling coil, an adjustable motor base for standard NEMA frame motors and a condensate pan that fits under the expansion valve. There shall be an access panel with handles on each side of the unit. Casing joints shall be sealed with gasket material.

a. The unit shall be mounted on a concrete pad, size and reinforcing in accordance with the manufacturer's instructions.

b. The fan section, the cooling coil section, the partition between the hot and cold decks, and the zoning damper frame shall be internally insulated at the factory with at least one-inch, 3/4-pound density, coated fiber glass cemented in place with waterproof adhesive. Insulation fire-retarding characteristics shall be in accordance with NFPA Bulletin No. 90A.

c. Condensate pan, with threaded drain connections, shall extend completely under the coil section and shall be internally insulated with waterproof, closed cell, rigid polyurethane foam insulation. The entire base unit shall be surrounded by a trough, complete with drain connections, that is a part of the unit construction.

d. Cooling coil shall be the cartridge type, removable from either side, supported the entire length in tracks. Unit design shall incorporate even air distribution across the face of the coil and eliminate air passage around the coil.

e. The coil shall meet the applicable construction and testing standards of the American Standard Safety Code for Mechanical Refrigeration (ASA B9.1-1964), and shall have the following working condition: 300 PSIG at 200° F. The coil shall be constructed of copper tubes arranged in staggered rows. Fins shall be smooth surface, evenly spaced and mechanically fastened to the tubes by winding the fin material under tension onto the coil tubes.

f. All accessories shall be in accordance with the unit manufacturer's specifications.

1F.9 AIR COOLED CONDENSING UNIT shall be a weather-proof construction, suitable for outdoor installation. Fans arrangement shall be so that the unit shall be unaffected by wind velocity, without necessity for wind deflectors. Fans shall be direct drive to eliminate belt problems.

a. Compressors shall be hermetic and capable of operating at partial load conditions without vibrations. Compressor motors shall be equipped with automatically reversible oil pump for pressurized lubrication, and with internal and external protection from excessive temperatures, abnormal pressures, and power irregularities.

b. Unit shall be equipped with all appurtenances to ascertain proper function during all seasons of the year, and shall be of the packaged type, with controls, accessories, mounting, ratings, etc., according to the requirements shown on Drawings.

1F.10 HEAT PUMP shall be wall mounted, packaged, room type, with cleanable filter, fresh air intake, and remote ON-OFF switch. The unit shall be equipped with FAN HI, LO, VENT, VENT ONLY, OFF control, for manual adjustment. The casing shall be of the rust protection hot-dipped galvanized steel type. Model to be selected as per Drawings.

1F.11 CONTROLS shall be in accordance with the "Control Sequence" shown on the Drawings.

1F.12 PIPING AND ACCESSORIES:

a. Refrigerant Piping shall be copper pipe, or copper tubing, type K or L bright annealed, dehydrated, and sealed. Soft-temper tubing shall be used where bending is required, and where flare joints are used. Hard-drawn tubing shall be used where no bending is required and silver

brazed joints are used. Copper-tube joints shall be brazed except joints on lines 5/8 inch or smaller may be flared. Fittings for flare joints shall be standard SAE forged-brass flare type with short shank flare units. Fittings for brazed joints shall be wrought-copper or forged-brass sweat fittings. Cast sweat-type fittings will not be allowed for brazed joints.

b. Solenoid Valves for Refrigerant Service shall be packless type, with stainless-steel trim, rated for continuous-duty service, provided with manual lift stems and designed for type of refrigerant used. The valve capacities shall be sufficient for the requirements of the installation at a pressure drop not in excess of 2 psi.

c. Strainers shall be installed in the refrigerant line on the inlet side of each expansion valve. Strainers may be an integral part of the expansion valve.

d. Sight Glasses shall be glass see-through type with cover cap on each side. Sight glass shall be provided in liquid line immediately preceding each refrigerant expansion valve.

e. Copper Tubing shall be cut square, ends reamed, and all filings and dust wiped from the interior of the pipe. Joints in refrigeration piping shall be brazed with silver solder. Excess solder shall be wiped from the joint before the solder hardens.

f. Refrigerant Valves in gas lines shall be installed with stems horizontal or above. Stop valves shall be installed on each side of each piece of equipment and at any other points indicated or required for maintenance, isolation, charging, or sectionalizing purposes.

1F.13 ELECTRIC HEATING COILS (Blast heating coils): Shall be custom built, "slip-in" type, so that the entire heater frame, except the terminal box, slips inside the duct, matching exactly the respective duct dimensions. The heaters shall be equipped with built-in magnetic contactors, fuses, built-in primary and secondary over-temperature safety protection (to meet U.S. National Electric Code requirements), insulated terminal box and all accessories required for an uninterrupted and safe operation.

1F.14 DUCTWORK:

a. General: Ductwork shall be constructed of galvanized steel sheets. Unless otherwise approved, ducts shall conform accurately to the

dimensions indicated, and shall be straight and smooth on the inside, with joints neatly finished. Ducts shall be anchored securely to the building structure, and shall be so constructed and installed as to be completely free from vibration under all conditions of operation. Curved elbows shall have a centerline radius not less than 1-1/2 times the width of duct. Joints shall be made substantially airtight, and no dust marks from air leaks shall show at duct joints or connections to grilles, registers, and diffusers. Laps shall be made in the direction of airflow. Edges and slips shall be hammered down to leave a smooth interior-duct finish. Button or bolt connections in standing seams shall be placed at fixed centers not greater than 6-inch (15.5 cm.) spacing. Transformations shall be made with a slope ratio of 5:1 minimum and 7:1 where practicable, or in a specifically approved manner. Unless otherwise specified, the sheet-metal ducts and stiffeners shall conform to table 1 hereinafter. Duct construction, hangers, and anchors shall comply with details outlined in ASHRAE or Sheet Metal and Air Conditioning Contractors' National Association, unless otherwise shown.

Table 1

Sheet-metal gages for rectangular-duct construction

Thickness, inch (gage)		Maximum side inches	Type transverse joint connections ¹	Bracing
Galv.	Steel			
0.0217 (26)		Up through 12	S, drive, pocket, or bar slips on 7-ft. 10-in. centers.	None
		13 through 18	S, drive, pocket, or bar slips on 7-ft. 10-in. centers.	None
0.0276 (24)		19 through 30	S, drive, 1-in. pocket or 1-in. bar slips on 7-ft. 10-in. centers ^{2,3}	1x1x1/8 in. angles mid- way between joints
		31 through 42	Drive, 1-in. pocket, or 1-in. bar slips on 7-ft. 10-in. centers ^{2,3}	1x1x1/8 in. angles mid- way between joints
0.0336 (22)		43 through 54	1-1/2-in. angle connections or 1-1/2-in. pocket, or 1-1/2-in. bar slips with 1- 3/8-in. x 1/8-in. bar re- inforcing on 7-ft. 10-in. centers ^{2,4}	1-1/2x1-1/2x 1/8 in. angles midway between joints

1 Other joint connections of equivalent mechanical strength and airtightness may be used, when such joints are recognized as standard designs by ASHRAE or SMACNA.

2 Duct sections of 3-ft. 9-in. length may be used with bracing angles omitted, instead of 7-ft. 10-in. lengths with joints and bracing indicated.

3 Alternate construction with cross break for transverse joints on 7-ft. 10-in. centers, without bracing permitted.

4 Alternate construction with cross break for transverse joints on 3-ft. 9-in. centers without bracing permitted.

b. Splitters and Dampers: Dampers shall have accessible operating mechanism, and where operators occur in finished portions of the building, operators shall be chromium plated with all exposed edges rounded. Splitter dampers shall be operated by damper quadrant or by 3/16 inch (4.7 mm.) rod, using two rods on splitters over 8 inches (20 cm.) in height. Splitter dampers shall be provided at each branch duct take-off whether shown on the Drawings or not. Damper quadrant or rod shall be brought through the side of the duct with locking set-screws and bushing. Manual volume-control dampers shall be operated by locking-type quadrant operators. Dampers and splitters shall be 2 gages heavier than duct in which installed. Multi-leaf dampers shall be opposed-blade type with maximum blade width of 12 inches (30 cm.). Splitter dampers shall be of sufficient length to close off either branch duct.

c. Air Deflectors or Turning Vanes shall be provided in all square elbows, duct-mounted supply outlets, and tap-in branch-takeoff connections. Air deflectors and turning vanes shall be factory fabricated and assembled.

d. Duct Access Doors: Hinged access doors shall be provided at all heaters, and at all other apparatus requiring service and inspection in the duct system. Access doors shall be 15 by 18 inches (39 cm. by 47 cm.) unless indicated otherwise. Where size of duct will not accommodate this size, access doors shall be made as large as practical. Access doors shall be provided on each side of each air-handling unit and shall not be less than 24 by 24 inches (60 cm. by 60 cm.). Access doors shall be of rigid type and shall be provided with felt gaskets to make doors airtight. Doors shall be provided with galvanized hinges having bronze pins and two approved brass fasteners. All doors 24 by 24 inches (60 cm. by 60 cm.) or larger shall be provided with fasteners that can be operated from both sides.

Access doors in insulated ducts shall be of the insulated type. Doors shall swing so that fan pressure or suction holds the door closed, unless otherwise indicated.

e. Duct Test Holes: Holes with patches in ducts and plenums shall be provided where directed or necessary for using pitot tubes for taking air measurements to balance the air systems. At each of these locations where ducts or plenums are insulated, extension shall be provided with plug fittings.

f. Apparatus Connections: At point where sheet-metal connections are made to fans or where ducts of dissimilar metals are connected, a flexible connection of 15-ounce woven asbestos, or other approved non-combustible material, approximately 6 inches (15 cm.) in width shall be installed and securely fastened by zinc-coated iron clinch-type bands.

g. Duct Sleeves shall be fabricated from 22-gage galvanized sheet steel unless otherwise indicated. Flanges constructed of 22-gage galvanized sheet steel not less than 4 inches (10 cm.) wide shall be installed tight against the wall on each side of the wall and fastened to the sleeve. Duct insulation and vapor barrier shall extend through the duct sleeve. Sleeves shall be 2 inches (5 cm.) larger than the duct unless otherwise required by the thickness of the insulation used. Framed openings shall be provided for ducts larger than 12 inches (30 cm.) in diameter and for all square and rectangular ducts. The space between the duct or duct insulation and the opening or sleeve shall be packed with commercial-grade twisted asbestos rope.

h. Duct Supports shall consist of not less than 1 inch by 1/16 inch (25 mm. by 1.5 mm.) galvanized strap-iron hangers spaced not over 4 feet (1.22 m.) on centers. Duct risers shall be supported at each floor.

i. Security Bars: Where security bars are required, these shall be installed according to the Contracting Officer's requirements.

1F.15 DIFFUSERS AND GRILLES:

a. General: Diffusers and grilles shall be factory-fabricated steel or aluminum and shall distribute the quantity of air specified evenly over space intended without causing noticeable drafts over 50 fpm in occupied zone, or dead spots anywhere in the conditioned area. The Contractor shall be responsible for diffusion, spread, drop, and throw. If, according to the

certified data of the manufacturer of the proposed units, the sizes indicated will not perform satisfactorily, the units shall be reselected to perform quickly and effectively in accordance with the manufacturer's recommendations as approved by the Inspector. A schedule of all air inlets and outlets indicating location, specified air quantity, neck or face velocity, noise level, pressure drop, and maximum and minimum diffusion range shall be submitted to the Contracting Officer. Diffusers and grilles shall be provided per Drawings. After the system is in operation, if excessive noise, drafts, or dead spots, are noticeable in the conditioned spaces due to improper selection of type and size of diffuser or grille, the unit shall be changed to the proper size and type without additional cost.

b. Diffusers shall be rectangular, of the type indicated on the Drawings, and shall have integral antismudge rings or shall be furnished with separate antismudge rings. Units shall not extend more than 4-1/2 inches (12 cm.) below the ceiling. Sponge-rubber gasket may be provided between ceiling and diffuser in lieu of antismudge ring. Duct collar connecting the duct to diffuser shall fit inside of diffuser neck.

c. Grilles shall be of the type indicated on the Drawings. Grilles shall be provided with sponge-rubber gasket between flange and wall or ceiling. Free area of grilles shall be not less than 75 percent of face area.

1F.16 INSULATION: Insulation of ducts and refrigerant piping shall be as indicated on the Drawings.

1F.17 EQUIPMENT INSTALLATION: Necessary supports shall be provided for equipment, appurtenances, pipe, and ductwork as required; these include frames or supports for air conditioners, condenser, coils, dampers etc., requiring supports.

1F.18 ACCESS PANELS shall be provided for all concealed valve controls, dampers, or any item requiring inspection or maintenance. Access panels shall be of sufficient size and so located that the concealed items may be serviced and maintained or completely removed for replacement.

1F.19 CLEANING, TESTING, AND BALANCING:

a. Cleaning and Adjusting: Pipes shall be cleaned free of scale and thoroughly flushed of all foreign matter. Strainers and valves

shall be thoroughly cleaned. Ducts, plenums, and casings shall be thoroughly cleaned of all debris and blown free of all small particles of rubbish and dust before installing. Equipment shall be wiped clean, with all traces of oil, dust, dirt, or paint spots removed. Temporary filters shall be provided for all fans that are operated during construction, and after all construction dirt has been removed from the building, new filters shall be installed. Bearings shall be properly lubricated with oil or grease as recommended by the manufacturer. Belts shall be tightened to proper tension. All control valves and other miscellaneous equipment requiring adjustment shall be adjusted to setting indicated or directed. Fans shall be adjusted to the speed indicated by the manufacturer to meet specified conditions.

b. Refrigerant Piping connecting condensers or cooling coils remotely installed shall be subjected to a pneumatic test. The pneumatic testing shall be done with anhydrous carbon dioxide or dry nitrogen. The system shall be proved tight under test pressure by first checking each joint with soap solution and second, with a halide torch. Leaks detected shall be repaired by taking the joint apart, thoroughly cleaning, and re-making as a new joint. Joints repaired by calking or remelting and adding more brazing material will not be acceptable. The system will be proved tight and free of leaks by successfully completing the soap and detector tests and by allowing the leak-test pressure to remain on the system for 24 hours with no drop in pressure. Correction of 0.3 pound per square inch will be allowed for each degree change in the initial and final temperature of the surrounding air, plus for an increase and minus for a decrease. After the above-mentioned tests have been satisfactorily completed and the pressure relieved, the entire system shall be evacuated to an absolute pressure of 5,000 microns (0.2 inch of Hg) or less at ambient room temperature of not less than 55 degrees F. The vacuum line shall be closed, and the system shall stand for 2 hours. After this period the increase in absolute pressure shall not exceed 25 microns. During this test, pressures shall be recorded using a thermocouple-type, electronic-type, or a calibrated micron gage. Upon completion of the test, the vacuum shall be broken by charging the system with dry refrigerant for which the system is designed.

c. Ductwork: Ducts shall be tested and made substantially airtight at static pressure indicated for the system before covering with insulation. Substantially airtight shall be construed to mean that no air leakage is noticeable through the senses of feeling or hearing.

d. Duct Systems shall be balanced to produce air quantities within 5 percent of indicated.

1F.20 PERFORMANCE TESTS: After cleaning, balancing, and testing operations have been completed, as hereinbefore specified, the system shall be tested as a whole to see that all items perform as an integral part of the system, and that temperatures and conditions are evenly controlled throughout the building. Corrections and adjustments shall be made as necessary to produce the conditions indicated.

1F.21 ACOUSTICAL TREATMENT (ROOM NO. 10):

a. General: The acoustical system shall be a non-combustible type of lay-in panel on a metal suspension system of the exposed type, complete with hanger wires or straps, main runners and cross members, edge strips and snap-on covers for all tees, cross-tees and edge strips. Supports for lighting fixtures and other accessories shall be installed with the suspension system.

b. Materials: Manufacturers' names and products specified hereinafter are given to establish standards of quality and appearance, but not to limit competition. Equal products of other manufacturers will be considered and proposed substitutions shall be submitted in advance for evaluation and comparison by the Contracting Officer, who shall approve substitutions in writing.

c. Acoustical Panels: Lay-in type, shall be glass fiber with plastic film facing, "Spanacoustic" as manufactured by the Johns - Manville Corporation, or equal as approved. Flame resistance shall be Class A. Size shall be 2 by 2 feet by one inch thick. Weight shall be not over 0.20 lb. per square foot. Facing film texture and color shall be as required by the Contracting Officer.

d. Suspension System: Suspended ceiling system shall consist of steel runner tees, 2 feet apart, and cross or nogging tees 2 feet apart. Cross tees shall run in a straight line from tee to tee. System shall be as per Drawings. Tees shall be formed of 18 gauge sheet and shall be complete with all spring clips, plates and brackets, perimeter angle, acoustical panel fastening devices, and all accessories. Suspension wire shall be 8 gauge galvanized wire or equivalent steel straps. Main runner tees shall be 2 feet apart and tied to construction above every 6 feet 8 inches apart, and not more than 6 inches from ends at walls of room or space. All steel

shall be factory primed. Cover strips shall be applied to bottom of all tees and perimeter angle and shall be white polyvinyl chloride plastic of plain, flat-surfaced, snap-on type.

e. Samples: Submit samples for approval before fabrication of the following:

- (1) Two (2) lengths of tees, one main and one cross tee with supporting attachment brackets, each 12 inches (30 cm.) long, factory primed.
- (2) One piece of snap-on plastic moulding cover strip, 12 in. (30 cm.) long.
- (3) Two ceiling tile panels 2 by 2 feet (60 by 60 cm.) square.
- (4) One of each acoustical panel fastening devices.

f. Erection of Ceiling: Ceiling hanger wires or steel strap hangers shall in all cases be vertical and be suspended from structural supporting members, and secured by wire-tying in a secure manner and as approved by the Contracting Officer. Powder-driven fastenings may be used where approved. Where structural supporting members are at such spacing that the above requirements cannot be complied with, adequate intermediate support shall be provided. Suspension-system members shall be for exposed system. The system shall incorporate adequate provision for thermal expansion to prevent buckling. The system shall be symmetrical about the center lines of the spaces as per relevant Drawing. Joints at ceiling penetrations of other work shall be neatly made and shall be as tight as practicable. Edge members shall be set tightly against the wall, joints shall be smooth.

g. Cleaning: Following erection, dirty or discolored surfaces of acoustical units and support system shall be cleaned in accordance with the manufacturer's recommendations and left free from defects. Components that are damaged or improperly installed shall be removed and replaced as directed by the Contracting Officer.

h. Guaranty: All items of materials for the suspended ceiling and acoustic tiles shall be guaranteed in accordance with the requirements of the GUARANTY paragraph 1F.23 hereinafter.

1F.22 PAINTING: All ferrous metal items to be painted, shall receive a coat of approved type rust-inhibitive paint. Finish painting of all items and surfaces to be painted shall be as directed by the Contracting Officer.

1F.23 GUARANTY: All equipment to be furnished under this Specification shall be guaranteed for a period of one year from the date of acceptance, either for beneficial use or final acceptance, whichever is earlier, against defective materials, latent defects, design and workmanship. Upon receipt of notice from the Contracting Officer of failure of any part of the guaranteed equipment during the guaranty period, the affected part or parts shall be replaced promptly with new parts by and at the expense of the Contractor.

SPECIFICATION 1G

ELECTRICAL WORK

1G.1 SCOPE: This Specification covers electrical work, complete. All work shall be as shown on the Drawings and specified herein, in strict accordance with the U.S. National Electrical Code [REDACTED] and Regulations. 25X1A

1G.2 APPLICABLE DOCUMENTS: The latest issues in effect of the following Codes and Regulations form a part of this Specification.

U.S. National Electrical Code (1968)

25X1A

1G.3 GENERAL: All electrical material and equipment shall conform to and be installed in strict accordance with the best practices of the electrical manufacturing and construction industries. Defective equipment or equipment damaged in the course of installation or testing shall be replaced or repaired in a manner meeting the approval of the Contracting Officer. The Contract Drawings indicate the extent and general arrangement of the wiring systems. If any departures from the Contract Drawings are deemed necessary by the Contractor, details of such departures and the reason therefor shall be submitted to the Contracting Officer for approval. No such departures shall be made without prior written approval of the Contracting Officer.

1G.4 STANDARD PRODUCTS: Unless otherwise indicated on the Drawings and in writing by the Contracting Officer, the materials to be furnished under this specification shall be unused, first-grade, commercial quality standard products of a reputable manufacturer regularly engaged in the production of such equipment and shall be the manufacturer's latest standard design that complies with the specification requirements.

1G.5 MATERIAL AND EQUIPMENT SCHEDULE: As soon as practicable and within 30 days after the date of notice to proceed and before commencement of installation of any materials or equipment, the Contractor shall submit to the Contracting Officer for approval a complete list, in triplicate, of materials, fixtures, and equipment to be incorporated in the work. The list shall include the country of origin, name of manufacturer, catalog numbers, cuts, diagrams, drawings, and such other descriptive or technical

data as may be required by the Contracting Officer. Where factory literature does not describe the material in sufficient detail to insure conformance with the specifications, or when requested by the Contracting Officer, samples of material shall be submitted for approval. In the case of special made-to-order equipment, cabinet work, metal work, apparatus or shop fabricated items from standard components, shop drawings showing fabrication details, material specifications, finish, installation methods etc., shall be submitted in triplicate. No consideration will be given to partial lists submitted from time to time. Approval of materials will be based on manufacturers' published ratings. Any materials, fixtures and equipment listed that are not of first grade commercial quality or are not in accordance with the specification requirements shall be subject to rejection. Descriptive literature and shop drawings covering approved material and equipment shall remain in the possession of the Contracting Officer and material or equipment samples shall be retained until such time as the required quantities of approved material or equipment have been delivered to the building site, or until such time as determined by the Contracting Officer.

1G.6 EQUIPMENT INSTALLATION: The Contractor shall perform all operations of uncrating, assembly, setting in place, levelling, anchoring, connecting, testing and adjusting, for satisfactory operation of all machinery and equipment items. The locations shown on the Drawings are subject to minor revisions by the Contracting Officer to avoid interferences with utility lines or architectural features of the building. Measurements for mounting bolts, platforms, or recesses shall not be taken from the Drawings but shall be confirmed from approved equipment manufacturer's shop drawings or direct from the machinery or equipment. The electric circuits and services for other utilities shall be installed as indicated on the Drawings. The exact location of machinery junction boxes, conduit pipe, or tubing risers will be confirmed in the field prior to installation to provide the most convenient accessibility to the connection point of the machines.

1G.7 WORKMANSHIP: All installation and construction operations shall be performed in a workmanlike manner by skilled mechanics qualified to perform the most difficult operations pertaining to their respective crafts. The use of common labor for operations normally assigned to building trades craftsmen will not be acceptable.

1G.8 GROUNDING: The neutral conductor of the wiring system and all non-current carrying metal parts of electrical equipment shall be grounded.

The conduit system shall not be used as grounding means. Grounding system shall originate from the grounding bus of panel "D" for the lighting circuits and from the grounding bus of panel "B" for the power circuits, and shall consist of a separate grounding conductor installed in the same conduit or cable with the phase and neutral conductors. The grounding conductor shall have the same insulation and cross section with the phase and neutral conductors unless otherwise shown on Drawings. Each portion of the conduit system shall have bonded connections and shall be made electrically continuous and connected to the grounding system.

1G.9 WIRING METHODS: Wiring shall consist of thermoplastic insulated and sheathed cables protected by galvanized steel conduit or iron pipes where mechanical protection is required. Cables installed on walls shall be protected by galvanized steel conduits up to a level of 2.3 meters above finished floor. Cables to outdoor equipment shall be protected by conduit as shown on Drawings. Cables installed in the new hung ceiling space shall not have conduit protection.

a. Galvanized Steel Conduit or Iron Pipe shall be uninsulated galvanized pipe with threaded fittings in accordance with the [REDACTED]

25X1A

25X1A

b. Cables shall be multiconductor thermoplastic insulated and sheathed copper conductors, type NYY according to [REDACTED] specification 0271/4.60, and rated 0.6/1.0 KV.

25X1A

c. Conductors of cables shall have the sizes shown on Drawings. Unless otherwise shown or noted minimum conductor size for control circuits shall be 1.5 mm². Unless otherwise shown or noted minimum conductor size for power circuits shall be 4 mm².

d. Installation of Cables: Cables installed in the hung ceiling space shall be placed on a ladder type cable tray construction consisting of 50 by 25 by 6 mm. channels, 3/8" hanger rods, etc. The ladder type cable trays shall be supported every 1.2 meter independently from the suspension system of hung ceiling. Cables for lighting circuits installed in the suspended ceiling space shall be installed in conduit, or on channels, or fastened on the walls and ceiling every 0.3 meters.

e. Conduits shall be installed as indicated. Minimum size of raceways shall be 3/4 inch. All conduits shall be installed in such

a manner that electric cables can be installed after the conduit system is completed and so that the conductors can be removed and replaced at any time without damage to the conduit or wiring. All conduit bends or offsets shall be made without heating by an approved bending device and so formed that there will be no cross sectional distortion of the conduit. Approved fittings and prefabricated long radius bends may be used. Conduits shall be kept within 0.15 meters from parallel runs of flues and hot-water pipes.

(1) The Contractor shall supply all necessary hangers, straps, fittings and other material to install and support the conduits and junction boxes in a permanent and rigid manner on the type of surface provided, consistent with the architectural treatment in the location.

(2) Each Piece of Exposed Conduit, regardless of length, shall have at least one supporting strap or clamp, and as many additional straps as may be required to support the conduit in a manner approved by the Contracting Officer, entirely independent from junction boxes, fittings, or other components of the wiring system during and after the installation. Conduits shall be installed with runs parallel to walls, structural members or intersections of vertical planes and ceilings. All parallel runs of conduit shall be symmetrically placed.

(3) When Penetrations are made through walls, ceilings or fibers, holes shall be neatly made and shall be no larger than necessary for proper installation. After installation the holes shall be neatly filled with cement and surfaces restored to the original condition.

f. Junction Boxes and Outlet Boxes: All junction boxes, pull boxes, and outlet boxes shall be suitable for the conduit or cable system used. The minimum size of junction boxes shall be 70 mm. in diameter. Large pull boxes for cable shall be constructed of galvanized sheet steel and shall be gasketed. Minimum thickness of sheet steel shall be 2 mm.

1G.10 DISCONNECTING MEANS: All disconnect switches, fused disconnect switches and service switches shall have an adequate voltage and ampere rating for the loads they are called to carry or interrupt. All disconnecting means shall plainly indicate whether they are in the open or closed position and shall be operable manually by means of a handle or other suitable operating device. Disconnect switches shall open all the ungrounded supply conductors of the circuit. Disconnect switches shall be air insulated quick-make and quick-break.

1G.11 EQUIPMENT CONNECTION: All wiring for the connection of motors and control equipment as indicated on electrical Drawings, shall be furnished and installed under this Specification.

a. Flexible Connections of Short Length shall be provided for all motors and equipment subject to vibration or movement. Liquid-tight flexible conduit shall be used in wet locations.

1G.12 REPAIR OF EXISTING WORK: The work shall be carefully laid out in advance, and where cutting, channeling, chasing, or drilling of floors, walls, partitions, ceilings, or other surfaces is necessary for the proper installation, support, or anchorage of the conduit, raceways, or other electrical work, this work shall be carefully done, and any damage to buildings, piping, or equipment shall be repaired by skilled mechanics of the trades involved, at no additional cost [REDACTED]

25X1C

1G.13 LAMPS AND LIGHTING FIXTURES of the types and sizes as indicated shall be furnished complete.

a. Fluorescent Lamps shall have standard cool white characteristics and shall be of a type that will not require starter switches. Two 40-watt rapid start lamps shall be provided in each fixture.

b. Fixtures Type "A" shall be shallow type direct fixture for surface mounting and continuous row mounting. The fixture shall be 1 ft. by 4 ft. and suitable for two 40 watt rapid start lamps. The fixture body shall be steel with steel side surfaces and a depth of approximately 3-1/4 inch. Side steel wiring covers shall conceal all wiring and ballasts. The body shall have central feed wiring cover and bushed openings on both ends for feed-through wiring. The enclosure of the fixture shall be mounted in metal frame equipped with separable hinges and spring actuated stainless steel trigger-latches. The fixture shall be provided with a two-lamp internal thermally protected radio suppressed H.P.F. ballast. The fixture shall be treated with a five-stage coating of zinc phosphate and shall have a hot-bonded baked white enamel finish. Through feed wiring between fixtures shall consist of high temperature thermoplastic insulated conductors. Straps for mounting on the type of hung ceiling specified on Drawings shall be provided. The enclosure of the fixture shall be K-12 Prismatic 100% virgin Acrylic. Fixture shall be DAY-BRITE type DAYLUME or approved equal.

1G.14 TESTS: After the installation is completed, and at such time as the Contracting Officer may direct, the Contractor shall conduct an

operating test for approval. The equipment shall be demonstrated to operate in accordance with the requirements of this Specification. The test shall be performed in the presence of the Contracting Officer or an authorized representative. The Contractor shall furnish all instruments and personnel required for the tests, and the Contracting Officer will furnish the necessary electric power.

1G.15 GUARANTY: All switches and lighting fixtures to be furnished under this Specification shall be guaranteed against defective materials, design, and workmanship for a period of 1 year from the date of acceptance, either for beneficial use or final acceptance, whichever is earlier. Upon receipt of notice from the Contracting Officer of failure of any part of the guaranteed equipment during the guaranty period, the affected part or parts shall be replaced promptly with new parts by and at the expense of the Contractor.

TAB

25X1C

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Next 3 Page(s) In Document Exempt

Approved For Release 2000/06/07 : CIA-RDP78-06505A000700150003-1

CONSTRUCTION COST ESTIMATE

DATE PREPARED

26 Nov 67

SHEET 4 OF 14

BASIS FOR ESTIMATE

- ☐ CODE A (No design completed)
☐ CODE B (Preliminary design)
☒ CODE C (Final design)
☐ OTHER (Specify)

DRAWING No.

ESTIMATE

TRADES

SUMMARY

QUANTITY

NO.
UNITSUNIT
MEASPER
UNIT

LABOR

TOTAL

MATERIAL

PER
UNIT

TOTAL

TOTAL
COST

1. AC HEAT & EQUIP. (Contd.)

c. Heat Pump Unit
 Package Type Amara
 12-36 H. or equal room
 unit, heating-cooling,
 cap. 11,500 BTU/Hr,
 complete

1

EA

L.S.

100

L.S.

500

8600

d. Condensing Unit
 Air-cooled, complete
 with compressors and
 motor, condenser,
 controls and accessories,
 factory assembled
 piped, pressure and
 tested, minimum
 cooling cap. 52,000 Btu
 hrs, provided with
 main disconnect means
 38 H. or 0.64
 square

1

EA

L.S.

1,200

L.S.

7,500

8,700

CONSTRUCTION COST ESTIMATE

DATE PREPARED

26 Nov 69

SHEET 5 OF 14

BASIS FOR ESTIMATE

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DRAWING No.

ESTIMATE

TABLES

SUMMARY

QUANTITY

NO.
UNITSUNIT
MEASPER
UNIT

LABOR

TOTAL

MATERIAL

PER
UNIT

TOTAL

TOTAL
COST

1. AC PLANT & EQUIP. (Contd)

e. Removals

Remove existing AC
unit and all relative
items of existing
system.

1

JOB

L.S.

\$ 220

L.S.

\$ 30

\$ 250

f. Thermostats

Modulating type.

Honeywell No. T92A

or equal

4

EA

5.00

20

30.00

120

140

Electric type, 2-stage,

Honeywell T42H, or

equal

2

EA

5.00

10

30.00

60

70

g. Refrigerant Lines

Copper tubing

2 1/8" dia.

20

LM

1.50

30

3.00

160

190

1 5/8" dia.

20

LM

1.20

24

6.00

120

144

1 1/8" dia.

20

LM

0.80

16

3.70

74

90

CONSTRUCTION COST ESTIMATE

DATE PREPARED

26 Nov 69

SHEET 6 OF 14

BASIS FOR ESTIMATE

- ☐ CODE A (No design completed)
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☐ OTHER (Specify)

DRAWING No.

ESTIMATE

TRADES SUMMARY	QUANTITY		LABOR		MATERIAL		TOTAL COST
	NO. UNITS	UNIT MEAS	PER UNIT	TOTAL	PER UNIT	TOTAL	
<u>1. NO PLANT & EQUIP. (Condo)</u>							
<u>h. Tube Insulation</u>							
Foam plastic, closed cell pipe insulation.							
Isom-Mankville acrolute or equal.							
For 2 1/8" tube	20	LM	1.00	\$ 20	3.00	\$ 60	\$ 80
For 1 5/8" tube	20	LM	1.00	20	2.50	50	70
<u>i. Valves & Accessories</u>							
Expansion valve, 1 1/8"	2	EA	5.00	10	35.00	70	80
Isolation valve, 1 1/8"	2	EA	5.00	10	35.00	70	80
Gate valve 1 1/8"	1	EA	3.00	3	20.00	20	23
Strainer 1 1/8"	1	EA	3.00	3	20.00	20	23
Moisture indicator	1	EA	5.00	5	30.00	30	35
Filter drier	1	EA	5.00	5	45.00	45	50
<u>j. Flexible Connections</u>							
For 2 1/8" tube	2	EA	2.00	4	12.00	24	28
For 1 5/8" tube	2	EA	1.80	4	9.00	18	22
For 1 1/8" tube	2	EA	1.50	3	6.00	12	15

CONSTRUCTION COST ESTIMATE

DATE PREPARED

26 Nov 67

SHEET 7 OF 14

BASIS FOR ESTIMATE

- ☐ CODE A (No design completed)
☐ CODE B (Preliminary design)
☒ CODE C (Final design)
☐ OTHER (Specify)

DRAWING No.

ESTIMATOR

TOTALS

SUMMARY

QUANTITY

NO.
UNITSUNIT
MEASPER
UNIT

LABOR

TOTAL

MATERIAL

PER
UNIT

TOTAL

TOTAL

COST

1. AC PUMP & EQUIP. (Cont'd)

1. Miscellaneous Items

Pipe hangers and
 supports, pipe sleeves,
 misc. metal items
 and others.

1

107

L.S.

\$100

L.S.

\$200

\$300

Estimated Direct Cost

\$2,862

\$15,578

\$18,440

Contractor's Overhead & Profit 30%

5,510

TOTAL ESTIMATED COST

\$23,950

CONSTRUCTION COST ESTIMATE

DATE PREPARED

26 Nov 67

SHEET 8 OF 14

BASIS FOR ESTIMATE

- ☐ CODE A (No design completed)
☐ CODE B (Preliminary design)
☒ CODE C (Final design)
☐ OTHER (Specify)

DRAWING No.

ESTIMATE

THINGS

SUMMARY

QUANTITY

LABOR

MATERIAL

TOTAL

NO.
UNITSUNIT
MEASPER
UNIT

TOTAL

PER
UNIT

TOTAL

COST

2. DUCTWORK

a. Ducts

Galvanized sheet
metalwork complete
including stiffeners,
hangers and supports.

3300 KGS

0.50

1,650

1.30

4,270

5,940

b. Duct termination

Fiberglass 1" thick
w/ vapor barrier

300 SM

2.00

600

6.00

1,800

2,400

c. Supply Grilles

Anemostat XRC 240.

as equal.

30 x 10 inches

10

EA

5.00

50

27.00

270

320

20 x 8 inches

6

EA

3.00

18

16.00

96

114

16 x 8 inches

2

EA

2.00

4

14.00

28

32

10 x 8 inches

6

EA

2.00

12

11.00

66

78

d. Air Diffusers

Anemostat E.P. as equal.

18" dia.

12

EA

3.00

36

25.00

300

336

CONSTRUCTION COST ESTIMATE

DATE PREPARED

26 Nov 69

SHEET 9 OF 14

BASIS FOR ESTIMATE

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☐ OTHER (Specify)

DRAWING No.

ESTIMATE

TRADES	SUMMARY	QUANTITY			LABOR		MATERIAL		TOTAL COST
		NO. UNITS	UNIT MEAS	PER UNIT	TOTAL	PER UNIT	TOTAL		
	2. <u>MECHANICAL (Cont'd)</u>								
	e. <u>Return Grilles</u>								
	<u>Anemostat X 35 1100,</u>								
	<u>or equal.</u>								
	30 X 8 inches	13	EA	5.00	\$65	24.00	\$312	\$377	
	16 X 8 inches	1	EA	2.00	2	14.00	14	16	
	11 X 8 inches	1	EA	2.00	2	12.00	12	14	
	10 X 16 inches	21	EA	3.00	63	16.00	336	399	
	10 X 8 inches	2	EA	2.00	4	11.00	22	26	
	10 X 4 inches	3	EA	2.00	6	9.00	27	33	
	<u>Estimated Direct Cost</u>				\$2,512		\$7,573	\$10,085	
	<u>Contractor's Overhead & Profit 30%</u>							3,015	
	<u>TOTAL ESTIMATED COST</u>							\$13,100	

CONSTRUCTION COST ESTIMATE

DATE PREPARED

26 Nov 69

SHEET 10 OF 14

BASIS FOR ESTIMATE

☐ CODE A (No design completed)☐ CODE B (Preliminary design)☒ CODE C (Final design)☐ OTHER (Specify)

DRAWING No.

ESTIMATE

SUMMARY	QUANTITY		LABOR		MATERIAL		TOTAL COST
	NO. UNITS	UNIT MEAS	PER UNIT	TOTAL	PER UNIT	TOTAL	
<u>3. ELECTRICAL WORK</u>							
<u>a. Fluorescent Fixtures</u>							
Type A, complete	53	EA	5.00	265	40.00	2,120	2,385
<u>b. Receptacles</u>							
15A, 250V, with side earthing contacts	1	EA	0.50	1	2.00	2	3
<u>c. Switches</u>							
Single pole	2	EA	0.50	1	1.50	3	4
Three-way	2	EA	0.50	1	2.00	4	5
Disconnect, 2P-15A	1	EA	2.00	2	8.00	8	10
Disconnect, 3P-40A	2	EA	5.00	10	25.00	50	60
Disconnect, 3P-25A, WP	1	EA	5.00	5	30.00	30	35
Disconnect, 3P-100A, WP	1	EA	7.00	7	70.00	70	77
<u>d. Steel Cabinet</u>							
Galvanized steel, painted to house							
all disc switches and starters	1	EA	1.50	10	1.50	70	80

CONSTRUCTION COST ESTIMATE

DATE PREPARED

26 Nov 69

SHEET 11 OF 14

BASIS FOR ESTIMATE

- ☐ CODE A (No design completed)
☐ CODE B (Preliminary design)
☒ CODE C (Final design)
☐ OTHER (Specify)

DRAWING No.

ESTIM

THINGS

SUMMARY

QUANTITY

NO.
UNITSUNIT
MEASPER
UNIT

LABOR

TOTAL

MATERIAL

PER
UNIT

TOTAL

TOTAL

COST

2. ELECTRICAL WORK (Cont'd)e. Cable ConductorsType NYL

2 X 1.5 mm ²	30	LM	0.10	\$3	0.30	\$9	\$12
3 X 1.5 mm ²	120	LM	0.10	12	0.40	48	60
2 X 4 mm ²	6	LM	0.20	1	0.60	4	5
3 X 4 mm ²	110	LM	0.20	22	0.80	88	110
4 X 4 mm ²	16	LM	0.25	4	1.05	17	21
5 X 4 mm ²	6	LM	0.25	2	1.35	8	10
6 X 4 mm ²	6	LM	0.30	2	1.70	10	12
4 X 10 mm ²	110	LM	0.40	16	2.60	104	120
4 X 16 + 1 X 16 mm ²	40	LM	1.00	40	5.00	200	240
2 X 25 + 1 X 25 mm ²	50	LM	1.00	50	5.00	250	300
2(3 X 95 + 1 X 35) mm ²	12	LM	6.00	72	34.00	408	480

f. ConduitGalv. iron pipe

3" dia.	22	LM	1.50	33	6.00	132	165
2" dia.	68	LM	1.00	68	3.50	238	306
1 1/2" dia.	19	LM	0.80	15	2.50	48	63
3/4" dia.	175	LM	0.50	88	1.70	298	386

CONSTRUCTION COST ESTIMATE				DATE PREPARED 26 Nov 69		SHEET 12 OF 14	
DRAWING No.				ESTIMATE			
				Basis for Estimate			
TRADES				LABOR		MATERIAL	
SUMMARY		QUANTITY	PER UNIT	TOTAL	PER UNIT	TOTAL	TOTAL COST
		NO. UNITS	UNIT MEAS				
3. ELECTRICAL WORK (Contd.)							
g. Connections							
To existing and new equipment, and to existing panelboard, including misc. items, hangers and supports.							
1 JOB		L.S.		\$100	L.S.	\$20	\$120
Estimated Direct Cost				\$830		\$4,237	\$5,067
Contractors Overhead & Profit 30%							1,531
TOTAL ESTIMATED COST							\$6,600

CONSTRUCTION COST ESTIMATE

DATE PREPARED

26 Nov 67

SHEET 13 OF 14

BASIS FOR ESTIMATE

- ☐ CODE A (No design completed)
☐ CODE B (Preliminary design)
☒ CODE C (Final design)
☐ OTHER (Specify)

DRAWING No.

ESTIMATE

TRADES	SUMMARY	QUANTITY		LABOR		MATERIAL		TOTAL COST
		NO. UNITS	UNIT MEAS	PER UNIT	TOTAL	PER UNIT	TOTAL	
4. SUSPENDED CEILING	Suspended acoustic ceiling, complete, in place, including main channels, cross tees, hangers, perimeter angles, trim, acoustic tile and accessories.							
	Suspension system	141	SM	2.00	\$282	5.00	\$705	\$987
	Acoustic tile	115	SM	1.00	115	3.00	345	460
	Estimated Direct Cost				\$397		\$1,050	\$1,447
	Contractors Overhead & Profit 30%							453
	TOTAL ESTIMATED COST							\$1,900

CONSTRUCTION COST ESTIMATE

DATE PREPARED

26 Nov 62

SHEET 14 OF 14

BASIS FOR ESTIMATE

☐ CODE A (No design completed)☐ CODE B (Preliminary design)☒ CODE C (Final design)☐ OTHER (Specify)

DRAWING No.

ESTIMATE

SUMMARY	QUANTITY		LABOR		MATERIAL		TOTAL COST
	NO. UNITS	UNIT MEAS	PER UNIT	TOTAL	PER UNIT	TOTAL	
5. TESTING & ADJUSTING Including all labor, material, instruments, tools, equipment and appliances, refrigerant test charge and operation charge, and systems adjustment to rated capacities shown.	1	JOB	L.S.	\$ 400	L.S.	\$ 100	\$ 500
Estimated Direct Cost				\$ 400		\$ 100	\$ 500
Contractors Overhead & Profit 30%							150
TOTAL ESTIMATED COST							\$ 650

TAB

25X1C

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SPECIFICATIONS FOR PANELBOARD

1. SCOPE: The work covered by this specification consists in furnishing one panelboard, complete.

2. APPLICABLE PUBLICATIONS: The following publications, of the issues in effect on the date of the invitation for bids or request for proposals, form a part of this Specification to the extent indicated by the references thereto:

2.1 Federal Specifications:

W-C-375 Circuit Breaker, Molded Case:
 Branch-Circuit and Service

W-P-115 Panel, Power Distribution

2.2 Underwriter's Laboratories, Inc. (UL):

Panel Base Assemblies

3. REQUIREMENTS: Panelboard shall be of the dead-front construction, equipped with molded-case circuit breakers. Panelboard shall conform to Federal Specification W-P-115 for Class 1, Type I, and shall be listed by Underwriters Laboratories, Inc. Breakers shall conform to Federal Specification W-C-375. Multipole circuit breakers shall be of common-trip type having a single operating handle. Plug-in circuit breakers are not acceptable. The panel shall have provisions for locking the branch circuit breakers in the "Off" position. Directories shall be mounted in holder behind protective covering. Panelboard shall have the following data:

Service : 208/120 volts A.C., 3-phase, 4-wire, solid neutral, 60 cycles.

Mains : 600A, three-pole main C.B., S.N.

Feeder : Incoming feeder enters at bottom. Wire size 2 x 500 MCM maximum, per phase and neutral.

Mounting : Surface

Knockouts : Standard

Ground bar : Yes

Cabinet box : Shall be code gage galvanized sheet steel. Trims and door shall be sheet steel with a rust inhibiting phosphatized coating.

Finish : Gray which is also suitable as prime coat.

Customer panel designation : Utility Panel "B".

Breakers : Minimum 7500 A.I.C., A.C. symmetrical. Federal Specification W-C-375.

Conductors : Conductors of incoming feeder and outgoing branch circuit wiring shall be copper.

Branches required	: <u>Quantity</u>	<u>Amperage</u>	<u>Number of Poles</u>
	1 Each	20A	1
	1 Each	20A	2
	2 Each	40A	3
	2 Each	50A	3
	1 Each	70A	3
	4 Each	100A	3
	1 Each	125A	3
	1 Each	500A	3

Panelboard shall be Square D Type ML, ITE Type CDP, Westinghouse Type CDP, G.E. Type CCB, or approved equal.

4. GUARANTY: All equipment to be furnished under this Specification shall be guaranteed for a period of one year from the date of acceptance, either for beneficial use or final acceptance, whichever is earlier, against defective materials, latent defects, design, and workmanship. Upon receipt of notice from the Government of failure of any part of the guaranteed equipment during the guaranty period, the affected part or parts shall be replaced promptly with new parts by, and at the expense of the manufacturer.

COST ESTIMATE

PANELBOARD "B"

Cost of panelboard as derived from "Square D" Catalog, complete, prewired, factory assembled, including frame and cabinet.

Comprised of:

1. Main ckt. bkr., 3P-600A plus SN	\$1,139
2. Ckt. bkr. 1P-20A,	22
3. Ckt. bkr. 2P-20A,	45
4. Ckt. bkr. 3P-40/50A, 11 ea. x 62 =	682
5. Ckt. bkr. 3P-70A,	84
6. Ckt. bkr. 3P-100A, 4 ea. x 84 =	336
7. Ckt. bkr. 3P-125A,	270
8. Ckt. bkr. 3P-500A,	<u>1,004</u>

Total Catalog List Price FOB Factory USA
(Subject to discount)

\$3,582

TAB

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25X1C

BASIS OF DESIGN

MECHANICAL

GENERAL

The design is based upon data and design criteria obtained from ASHRAE Guide 1967 and as per requirements in the "Scope of Work".

DESIGN CONDITIONS

Outdoor design conditions have been obtained from ASHRAE Guide 1967, HANDBOOK OF FUNDAMENTIALS, adjusted for site location.

Indoor design temperatures as per Scope of Work, thus:

Outdoor summer:	D.B. = 93°F	
	W.B. = 73°F	
	R.H. = 38%	
Outdoor winter:	D.B. = 30°F	
Indoor summer:	D.B. = 72°F)	Rooms: 10, 11, 12a,
	R.H. = 50%)	12b, 13
	D.B. = 75°F)	Rooms: 1, 2, 3, 4, 5c, 6a, 6b,
	R.H. = 50%)	7, 8, 9, 13a, 13b, 13c
Indoor winter:	D.B. = 70°F)	Rooms: 1, 2, 3, 4, 5c, 6a, 6b,
		7, 8, 9, 13a, 13b, 13c

HEAT TRANSMISSION COEFFICIENTS "U"

Roof:	0.25 BTU/Hr °F SF
Exterior wall:	0.56 Ditto
Interior wall:	0.50 "
Glass:	1.13 "
Perimeter factor:	42 BTU/Hr FT

AIR-CONDITIONING SYSTEM

The design calls for a central air-conditioning system (with a 20% reserve cooling capacity), serving the following rooms: 1, 2, 3, 4, 5c, 6a, 6b, 7, 8, 9, 10, 11, 12a and 12b. These rooms are consisting four zones as follow:

- Zone I : Room No. 10
- Zone II : Rooms Nos. 11, 12a & 12b
- Zone III : Rooms Nos. 1, 2, 3, 4, 5c & 6b
- Zone IV : Rooms Nos. 6a, 7, 8 & 9

The system includes a multizone, blow-thru type air-conditioning unit (located outdoors), an air-cooled condenser, roof mounted, and all necessary piping, ductwork, controls, etc. Each zone is thermostatically controlled by respective thermostat.

Zone II ductwork layout is designed on the basis of accomplishing the most effective distribution while retaining the existing A.C. system (comprising the two $7\frac{1}{2}$ -tons "Carrier" and one 5-ton "Chrysler" air-conditioning units and respective refrigeration equipment) considered capable for 100 percent A.C. back-up of Rooms 11 and 12a.

Room 13 air-conditioning load shall be carried out by the existing 5-ton "Chrysler" A.C. unit and respective air-cooled condenser.

Rooms 13a and 13b, considered as non-critical areas, shall be air conditioned by means of existing room conditioners relocated from SE wall of the building where they are now installed.

Room 13c shall be ventilated, only, by means of a wall exhaust fan (sized for 10 air changes per hour) utilizing treated air from adjacent air-conditioned spaces.

Rooms 5a and 5b shall be ventilated by means of existing ventilators utilizing treated air from the adjacent conditioned rooms.

HEATING

No heating is required for Zones I and II.

Blast heating coils installed in the main Zones III and IV ducts shall take care of the heating load of Rooms 1, 2, 3, 4, 5c, 6a, 6b, 7, 8 and 9.

Rooms 13a, 13b and 13c shall be heated by means of electric baseboard heaters relocated from rooms of Zones III and IV where they are now installed.

25X1A

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25X1C

SIZE x = 1250 Sq Ft x 10.5 = 13130 Cu Ft				ROOM NAME: 11 & 12A				
ITEM	AREA OR QUANTITY	FACTOR	SUN GAIN OR TEMP. DIFF	BTU/HOUR	ESTIMATE FOR JULY	LOCAL TIME SUN TIME	PEAK LOAD 8 PM	LOCAL TIME SUN TIME
SOLAR GAIN - GLASS					HOURS OF OPERATION			
GLASS	Sq Ft x	x			CONDITIONS	DB	WB	% RH
GLASS	Sq Ft x	x			OUTDOOR (OA)	82	72	38
GLASS	Sq Ft x	x			ROOM (RM)	72	60	40
GLASS	Sq Ft x	x			DIFFERENCE	21		
HORIZONTAL	Sq Ft x	x			OUTDOOR AIR			
SOLAR & TRANS. GAIN - WALLS & ROOF					PEOPLE x CFM/PERSON =			
SW WALL	150 Sq Ft x	0.96 x	40	3370	1250 Sq Ft x 0.25 CFM/PERSON = 310			
NW WALL	160 Sq Ft x	0.96 x	34	3090	CFM VENTILATION = 310			
NE WALL	125 Sq Ft x	0.96 x	28	1750	SWINGING OR REVOLVING DOORS PEOPLE x CFM/PERSON =			
WALL	Sq Ft x	x			OPEN DOORS DOORS x CFM/DOOR =			
ROOF	1250 Sq Ft x	0.25 x	49	15310	EXHAUST FAN CRACK FEET x CFM/FT =			
TRANS. GAIN - EXCEPT WALLS & ROOF					CFM INFILTRATION			
ALL GLASS	Sq Ft x	x			CFM OUTDOOR AIR THRU APPARATUS			
PARTITION	300 Sq Ft x	0.50 x	15	2250	APPARATUS DEWPOINT			
CEILING	Sq Ft x	x			EFFECTIVE SENS HEAT = 166900 ROOM SENS HEAT = 0.49			
FLOOR	Sq Ft x	x			FACTOR 166900 ROOM TOTAL HEAT			
INFILTRATION	CFM x	x	1.08		ADP INDICATED ADP = 52.3 F SELECTED ADP = 52 F			
INTERNAL HEAT					DEHUMIDIFIED AIR QUANTITY			
PEOPLE	5 PEOPLE x	250		1250	(1 - 0.1) BF x (T _{room} - T _{db}) = 10			
POWER	HP x KW x				DEHUM. CFM 166900 EFFECT. ROOM SENS HEAT = 8580 CFM			
LIGHTS	4000 WATTS x 1 x	3.41		13640	1.08 x 10 F = 10.8			
APPLIANCES ETC	24.7 x	3.41		14250	ROOM SENS HEAT = CFM			
ROOM SENSIBLE HEAT					SUPPLY AIR QUANTITY			
STORAGE	Sq Ft x	x		15170	ROOM SENS HEAT = CFM			
SAFETY FACTOR	5%			7260	1.08 x F = 10.8			
ROOM LATENT HEAT					RESULTING ENT & LVG COND. AT APPAR.			
SUPPLY DUCT	DUCT				EDB T _{room} F ₁ CFM ₁ x (T ₁ - F ₁) = T ₂ F			
HEAT GAIN	% + LEAK LOSS	2%			LDB T _{room} F ₂ BF x (T ₂ - F ₂) = T ₃ F			
OUTDOOR AIR	310 CFM x 21 F x 0.1 BF x 1.08			1360	FROM PSYCH CHART T _{db} F ₁ T _{wb} F			
EFFECTIVE ROOM SENSIBLE HEAT					NOTES			
LATENT HEAT								
INFILTRATION	CFM x	GR/LB x 0.68						
PEOPLE	5 PEOPLE x	210		1050				
STEAM	LB/HR x 1000							
APPLIANCES, ETC.								
ADDITIONAL HEAT GAINS								
VAPOR TRANS.	Sq Ft x 1/100 x	GR/LB x						
SUB TOTAL								
ROOM LATENT HEAT								
SUPPLY DUCT LEAKAGE LOSS								
OUTDOOR AIR								
EFFECTIVE ROOM LATENT HEAT								
EFFECTIVE ROOM TOTAL HEAT								
OUTDOOR AIR HEAT								
SENSIBLE								
LATENT								
RETURN								
DUCT								
HEAT GAIN								
GRAND TOTAL HEAT								

IF THIS ΔT IS TOO HIGH, DETERMINE SUPPLY CFM FOR DESIRED DIFFERENCE BY SUPPLY AIR QUANTITY FORMULA

WHEN BYPASSING A MIXTURE OF OUTDOOR AND RETURN AIR, USE SUPPLY CFM

WHEN BYPASSING RETURN AIR ONLY, USE DEHUMIDIFIED CFM

25X1C

SIZE 13.1' x 7.9' = 104 Sq Ft x 10.5' = 1090 Cu Ft					ROOM NAME 126				
ITEM	AREA OR QUANTITY	FACTOR	SUN GAIN OR TEMP. DIFF.	BTU/HOUR	ESTIMATE FOR	LOCAL TIME SUN TIME	PEAK LOAD	LOCAL TIME SUN TIME	
SOLAR GAIN - GLASS					HOURS OF OPERATION				
GLASS	Sq Ft x	x			CONDITIONS	DB	WB	% RH	
GLASS	Sq Ft x	x			OUTDOOR (OA)	75	78	38	
GLASS	Sq Ft x	x			ROOM (RM)	72	70	92	
GLASS	Sq Ft x	x			DIFFERENCE	21	xxx	xxx	
HORIZONTAL	Sq Ft x	x							
SOLAR & TRANS. GAIN - WALLS & ROOF					OUTDOOR AIR				
WALL	Sq Ft x	x			VENTI- LATION	104	PEOPLE x	CFM/PERSON =	
WALL	Sq Ft x	x					0.25	CFM/Sq Ft = 20	
WALL	Sq Ft x	x						CFM VENTILATION = 20	
WALL	Sq Ft x	x			SWINGING OR		PEOPLE x	CFM/PERSON =	
WALL	Sq Ft x	x			REVOLVING DOORS		DOORS x	CFM/DOOR =	
ROOF	104	Sq Ft x	8.25	49	INFI- LTRATION		EXHAUST FAN		
				1280			CRACK	FEET x	
TRANS. GAIN - EXCEPT WALLS & ROOF					CFM OUTDOOR AIR THRU APPARATUS				
ALL GLASS	Sq Ft x	x			APPARATUS DEWPOINT				
PARTITION	140	Sq Ft x	0.50	3	ESHF	EFFECTIVE SENS HEAT = 4560	EFFECT. ROOM SENS HEAT FACTOR = 40	EFFECT. ROOM TOTAL HEAT = 0.99	
CEILING	Sq Ft x	x			ADP	INDICATED ADP = 423 F	SELECTED ADP = 92 F		
FLOOR	Sq Ft x	x			DEHUMIDIFIED AIR QUANTITY				
INFILTRATION	CFM x	x	1.08		TEMP. RISE	(1 - 0.1 BF) x (T _{RA} - T _{RA}) = 92 F			
INTERNAL HEAT					DEHUM. CFM				
PEOPLE	PEOPLE x				DEHUM. CFM	4560	EFFECT. ROOM SENS HEAT = 240	CFM	
POWER	HP x KW x				OUTLET TEMP. DIFF.	1.08 x	CFM		
LIGHTS	800 WATTS x 1 x	3.41		2720	SUPPLY AIR QUANTITY				
APPLIANCES, ETC.	x				SUPPLY CFM	ROOM SENS HEAT =	CFM		
ADDITIONAL HEAT GAINS	x				BYPASS CFM	1.00 x	F ₂ LEAK AND GIPS	CFM	
STORAGE	Sq Ft x	x		4210	RESULTING ENT & LVG COND. AT APPAR				
SAFETY FACTOR	5%			210	EDB	TRM F	CFM x (T _{RA} - T _{RA}) = T _{RA}		
ROOM SENSIBLE HEAT					LDB	T _{APP} F	BF x (T _{RA} - T _{RA}) = T _{RA}		
SUPPLY DUCT	SUPPLY DUCT	FAN			NOTES				
HEAT GAIN	% + LEAK LOSS	% + HP	2%	90					
OUTDOOR AIR	20 CFM x 21 F x 0.1 BF x 1.08			50					
EFFECTIVE ROOM SENSIBLE HEAT									
LATENT HEAT									
INFILTRATION	CFM x	Gr/Lb x 0.69							
PEOPLE	PEOPLE x								
STEAM	Lb/Hr x 1050								
APPLIANCES, ETC.									
ADDITIONAL HEAT GAINS									
VAPOR TRANS.	Sq Ft x 1/100 x	Gr/Lb x							
SUB TOTAL									
SAFETY FACTOR	%								
ROOM LATENT HEAT									
SUPPLY DUCT LEAKAGE LOSS	%								
OUTDOOR AIR	20 CFM x 32 Gr/Lb x 0.1 BF x 0.69			50					
EFFECTIVE ROOM LATENT HEAT									
EFFECTIVE ROOM TOTAL HEAT									
OUTDOOR AIR HEAT									
SENSIBLE	20 CFM x 21 F x (1 - 0.1 BF) x 1.08			410					
LATENT	20 CFM x 32 Gr/Lb x (1 - 0.1 BF) x 0.69			390					
RETURN DUCT	RETURN DUCT	HP		5210					
HEAT GAIN	100	LEAK		110					
GRAND TOTAL HEAT									

IF THIS ΔT IS TOO HIGH, DETERMINE SUPPLY CFM FOR DESIRED DIFFERENCE BY SUPPLY AIR QUANTITY FORMULA.

† WHEN BYPASSING A MIXTURE OF OUTDOOR AND RETURN AIR, USE SUPPLY CFM, WHEN BYPASSING RETURN AIR ONLY, USE DEHUMIDIFIED CFM.

25X1C

SIZE 27.5' x 11.9' = 328 Sq Ft x 10.9' = 3440 Cu Ft				ROOM NAME: 13				
ITEM	AREA OR QUANTITY	FACTOR	SUN GAIN OR TEMP. DIFF.	BTU/HOUR	ESTIMATE FOR JULY	LOCAL TIME SUN TIME	PEAK LOAD 5 PM	LOCAL TIME SUN TIME
SOLAR GAIN - GLASS					HOURS OF OPERATION			
GLASS	Sq Ft x		x		CONDITIONS	DB	WB	RH
GLASS	Sq Ft x		x		OUTDOOR (OA)	93	78	50
GLASS	Sq Ft x		x		ROOM (RM)	71	60	50
GLASS	Sq Ft x		x		DIFFERENCE	21		
HORIZONTAL	Sq Ft x		x		OUTDOOR AIR			
SOLAR & TRANS. GAIN - WALLS & ROOF					VENTILATION 328 PEOPLE x 0.25 CFM/PERSON = 90			
NW WALL	290 Sq Ft x	0.56	x	34	CFM VENTILATION = 90			
SW WALL	125 Sq Ft x	0.56	x	40	SWINGING OR REVOLVING DOORS PEOPLE x CFM/PERSON =			
WALL	Sq Ft x		x		OPEN DOORS DOORS x CFM/DOOR =			
WALL	Sq Ft x		x		EXHAUST FAN CRACK FEET x CFM/FT =			
WALL	Sq Ft x		x		CFM INFILTRATION			
WALL	Sq Ft x		x		CFM OUTDOOR AIR THRU APPARATUS			
WALL	Sq Ft x		x		APPARATUS DEWPOINT			
WALL	Sq Ft x		x		EFFECTIVE SENS HEAT = 16820 EFFECT ROOM SENS HEAT = 0.97			
WALL	Sq Ft x		x		SENS HEAT FACTOR = 174.0 EFFECT ROOM TOTAL HEAT			
WALL	Sq Ft x		x		ADP INDICATED ADP = 52 F SELECTED ADP = 52 F			
WALL	Sq Ft x		x		DEHUMIDIFIED AIR QUANTITY			
WALL	Sq Ft x		x		(1 - 0.1 BF) x (T _{room} - T _{db}) = 18 F			
WALL	Sq Ft x		x		DEHUM. CFM 16820 EFFECT ROOM SENS HEAT = 850 CFM			
WALL	Sq Ft x		x		OUTLET TEMP DIFF ROOM SENS HEAT = F			
WALL	Sq Ft x		x		1.08 x CFM			
WALL	Sq Ft x		x		SUPPLY AIR QUANTITY			
WALL	Sq Ft x		x		ROOM SENS HEAT = CFM			
WALL	Sq Ft x		x		1.08 x F			
WALL	Sq Ft x		x		BYPASS CFM CFM = CFM			
WALL	Sq Ft x		x		RESULTING ENT & LVG COND. AT APPAR.			
WALL	Sq Ft x		x		EDB T _{room} F + CFM _{room} x (T _{room} - T _{db}) = T _{db} F			
WALL	Sq Ft x		x		LDB T _{room} F + BF x (T _{room} - T _{db}) = T _{db} F			
WALL	Sq Ft x		x		FROM PSYCH CHART T _{db} F, T _{wb} F			
INTERNAL HEAT					NOTES			
PEOPLE	2 PEOPLE x			400				
POWER	400 HP OR KW x			1260				
LIGHTS	400 WATTS x			1300				
APPLIANCES, ETC	300 " x							
ADDITIONAL HEAT GAINS								
INTERNAL HEAT SUB TOTAL								
STORAGE Sq Ft x x ()					15500			
SAFETY FACTOR 5%					780			
ROOM SENSIBLE HEAT					16280			
SUPPLY DUCT LEAKAGE LOSS					380			
HEAT GAIN % + LEAK LOSS % + HP 2%					210			
OUTDOOR AIR 30 CFM x 21 F x 0.1 BF x 1.08					16820			
EFFECTIVE ROOM SENSIBLE HEAT					17470			
LATENT HEAT								
INFILTRATION CFM x GR/LB x 0.68					420			
PEOPLE 2 PEOPLE x 210								
STEAM LB/HR x 1000								
APPLIANCES, ETC								
ADDITIONAL HEAT GAINS								
VAPOR TRANS SQ FT x 1/100 x GR/LB x								
INTERNAL HEAT SUB TOTAL					420			
SAFETY FACTOR 3%					440			
ROOM LATENT HEAT					440			
SUPPLY DUCT LEAKAGE LOSS 2%					10			
OUTDOOR AIR 30 CFM x 32 GR/LB x 0.1 BF x 0.68					200			
EFFECTIVE ROOM LATENT HEAT					640			
EFFECTIVE ROOM TOTAL HEAT					17470			
OUTDOOR AIR HEAT								
SENSIBLE 30 CFM x 21 F x (1 - 0.1 BF) x 1.08					1840			
LATENT 30 CFM x 32 GR/LB x (1 - 0.1 BF) x 0.68					1770			
RETURN DUCT HEAT GAIN					21050			
RETURN DUCT H ₂ O LEAK GAIN + PUMP % + PIPE LOSS %								
GRAND TOTAL HEAT					22130			

IF THIS ΔT IS TOO HIGH, DETERMINE SUPPLY CFM FOR DESIRED DIFFERENCE BY SUPPLY AIR QUANTITY FORMULA.

† WHEN BYPASSING A MIXTURE OF OUTDOOR AND RETURN AIR, USE SUPPLY CFM WHEN BYPASSING RETURN AIR ONLY, USE DEHUMIDIFIED CFM

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25X1C

SIZE 6-9' x 8-9' = 88 SQ FT x 10.5' = 400 CU FT					ROOM NAME: 13C				
ITEM	AREA OR QUANTITY	FACTOR	SUN GAIN OR TEMP. DIFF	BTU/HOUR	ESTIMATE FOR JULY	LOCAL TIME SUN TIME	PEAK LOAD	BPM	LOCAL TIME SUN TIME
SOLAR GAIN - GLASS					HOURS OF OPERATION				
GLASS	SQ FT x		x		CONDITIONS	DB	WB	RH	DP
GLASS	SQ FT x		x		OUTDOOR (OA)	93	78	38	61
GLASS	SQ FT x		x		ROOM (RM)	78	66	50	57
GLASS	SQ FT x		x		DIFFERENCE	15	12	88	4
HORIZONTAL	SQ FT x		x						
SOLAR & TRANS. GAIN - WALLS & ROOF					OUTDOOR AIR				
NE WALL	78 SQ FT x	0.56	x	25	VENTILATION	PEOPLE x CFM/PERSON =			
NW WALL	98 SQ FT x	0.45	x	34	10 am change	SQ FT x CFM/SQ FT = 60			
WALL	SQ FT x		x		SWINGING OR REVOLVING DOORS	PEOPLE x CFM/PERSON =			
WALL	SQ FT x		x		OPEN DOORS	DOORS x CFM/DOOR =			
WALL	SQ FT x		x		EXHAUST FAN	FEET x CFM/FT =			
ROOF	38 SQ FT x	0.25	x	49	CRACK	CFM INFILTRATION			
TRANS. GAIN - EXCEPT WALLS & ROOF					APPARATUS DEWPOINT				
ALL GLASS	SQ FT x		x		ESHF	EFFECTIVE SENS HEAT = 3900 EFFECT. ROOM SENS HEAT = 0.9			
PARTITION	SQ FT x		x		FACTOR	4250 EFFECT. ROOM TOTAL HEAT			
CEILING	SQ FT x		x		ADP	INDICATED ADP = 54 F SELECTED ADP = 52 F			
FLOOR	SQ FT x		x		DEHUMIDIFIED AIR QUANTITY				
INFILTRATION	CFM x		x	1.08	TEMP. RISE	(1 - 0.1 BF) x (T _{room} / 5 F - T _{atm} 32 F) = 23 F			
INTERNAL HEAT					DEHUM. CFM				
PEOPLE	1	PEOPLE x	250	250	3900	EFFECT. ROOM SENS HEAT = 160 CFM DA			
POWER		HP x KW x			1.08 x 23 F TEMP. x				
LIGHTS	200 WATTS x	1	3.41	680	OUTLET TEMP. DIFF.	ROOM SENS HEAT = F RM GLEY AIR			
APPLIANCES, ETC.					1.08 x	CFM x			
ADDITIONAL HEAT GAINS					SUPPLY AIR QUANTITY				
STORAGE	SQ FT x		x		SUPPLY CFM	ROOM SENS HEAT = CFM DA			
SAFETY FACTOR	3%				BYPASS CFM	1.08 x F _{DIFF} x 1.08 = CFM DA			
ROOM SENSIBLE HEAT					RESULTING ENT & LVG COND. AT APPAR.				
SUPPLY DUCT	SUPPLY DUCT				EDB	T _{room} F + CFM x (T _{atm} F - T _{room} F) = T _{room} F			
HEAT GAIN	% + LEAK LOSS				LDB	T _{atm} F + BF x (T _{room} F - T _{atm} F) = T _{atm} F			
OUTDOOR AIR	60 CFM x 1.8 F x 1.08			120	FROM PSYCH CHART T _{room} F, T _{atm} F				
EFFECTIVE ROOM SENSIBLE HEAT					NOTES				
LATENT HEAT									
INFILTRATION	CFM x		Gr/Lb x 0.68						
PEOPLE	1	PEOPLE x	210	210					
STEAM		Lb/Hr x 1950							
APPLIANCES, ETC.									
ADDITIONAL HEAT GAINS									
VAPOR TRANS.	SQ FT x 1/100 x		Gr/Lb x						
SUB TOTAL									
SAFETY FACTOR									
ROOM LATENT HEAT									
SUPPLY DUCT LEAKAGE LOSS									
OUTDOOR AIR									
EFFECTIVE ROOM LATENT HEAT									
EFFECTIVE ROOM TOTAL HEAT									
OUTDOOR AIR HEAT									
SENSIBLE									
LATENT									
RETURN DUCT									
HEAT GAIN									
GRAND TOTAL HEAT									

IF THIS ΔT IS TOO HIGH, DETERMINE SUPPLY CFM FOR DESIRED DIFFERENCE BY SUPPLY AIR QUANTITY FORMULA.

WHEN BYPASSING A MIXTURE OF OUTDOOR AND RETURN AIR, USE SUPPLY CFM WHEN BYPASSING RETURN AIR ONLY, USE DEHUMIDIFIED CFM

25X1C

COOLING LOAD SUMMARY

W Z O N	RM No	TOTAL RM. AIR (CFM)	FRESH AIR (CFM)	ZONE AIR (CFM)	ZONE TEMP (°F)	ROOM GR. TOTAL HEAT (BTU/HR)	ZONE TOTAL HEAT (BTU/HR)
I	10	7300	370	7300	72	167300	167300
II	11	8580	310	8820	72	190150	195670
	12b	240	20			5520	
III	1	370	50	1430	75	11730	47070
	2	330	60			11280	
	3	240	40			7960	
	4	170	40			5730	
	5c	160	30			5090	
	6b	160	30			5280	
IV	6a	1130	90	3380	75	33550	102480
	7	1060	150			34410	
	8	250	30			7870	
	9	940	60			26650	
TOTAL		20930	1280			512520	512520

25X1C

HEAT LOSSES						
ROOM NAME & NUMBER	PART OF STRUCTURE OR OUTSIDE AIR	NET AREA SQ. FT. OR CFM	"U" FACTOR	TEMP. DIFF. °F	HEAT LOSSES BTU/HR	ROOM TOTAL HEAT LOSSES BTU/HR
Rm. No. 1	GLASS	42	1.13	40	1700	8420
	DOOR					
	WALL	160	0.56	40	3590	
	PARTITION	11	0.50	20	110	
	ROOF OR CEILING	177	0.25	40	1770	
	FLOOR	25 x 42	42 BTU/HR FT		1050	
	INFILTRATION OR VENTILATION	570				
Rm. No. 2	GLASS	21	1.13	40	950	7700
	DOOR					
	WALL	126	0.56	40	2820	
	PARTITION	105	0.50	20	1050	
	ROOF OR CEILING	192	0.25	40	1920	
	FLOOR	15 x 42	42 BTU/HR FT		630	
	INFILTRATION OR VENTILATION	580				
Rm. No. 3	GLASS	21	1.13	40	950	5280
	DOOR					
	WALL	105	0.56	40	2350	
	PARTITION					
	ROOF OR CEILING	143	0.25	40	1430	
	FLOOR	10 x 42	42 BTU/HR FT		420	
	INFILTRATION OR VENTILATION	240				
Rm. No. 4	GLASS					3760
	DOOR	21	0.56	40	510	
	WALL	74	0.56	40	1660	
	PARTITION					
	ROOF OR CEILING	117	0.25	40	1170	
	FLOOR	10 x 42	42 BTU/HR FT		420	
	INFILTRATION OR VENTILATION	170				

25X1C

HEAT LOSSES						
ROOM NAME & NUMBER	PART OF STRUCTURE OR OUTSIDE AIR	NET AREA SQ. FT. OR CFM	"U" FACTOR	TEMP. DIFF. °F	HEAT LOSSES BTU/HR	ROOM TOTAL HEAT LOSSES BTU/HR
Rm No. 5C	GLASS					
	DOOR					
	WALL					
	PARTITION					
	ROOF OR CEILING	117	0.25	40	1170	1170
	FLOOR					
	INFILTRATION OR VENTILATION	160				
Rm No. 6A	GLASS	21	1.13	40	950	
	DOOR					
	WALL	121	0.56	40	2780	
	PARTITION	102	0.50	20	1020	
	ROOF OR CEILING	428	0.25	40	4280	
	FLOOR	14 x 42 BTU/HR FT			590	9980
	INFILTRATION OR VENTILATION	1130				
Rm No. 6B	GLASS	12	1.13	40	940	
	DOOR					
	WALL	93	0.56	40	1170	
	PARTITION	35	0.50	20	650	
	ROOF OR CEILING	74	0.25	40	740	
	FLOOR	6 x 42 BTU/HR FT			250	3370
	INFILTRATION OR VENTILATION	130				
Rm No. 7	GLASS	1	1.13	40	950	
	DOOR					
	WALL	200	0.56	40	4480	
	PARTITION					
	ROOF OR CEILING	416	0.25	40	4160	
	FLOOR	25 x 42 BTU/HR FT			1050	11230
	INFILTRATION OR VENTILATION	1060				

25X1C

HEAT LOSSES						
ROOM NAME & NUMBER	PART OF STRUCTURE OR OUTSIDE AIR	NET AREA SQ. FT. OR CFM	U FACTOR	TEMP. DIFF. °F	HEAT LOSSES BTU/HR	ROOM TOTAL HEAT LOSSES BTU/HR
Room 1	GLASS	21	1.13	40	950	6790
	DOOR					
	WALL	187	0.56	40	4100	
	PARTITION					
	ROOF OR CEILING	90	0.29	40	900	
Room 2	FLOOR	1 x 42 5/8	0.19		800	4420
	INFILTRATION OR VENTILATION	250				
	GLASS					
	DOOR					
	WALL					
Room 3	PARTITION	192	0.25	40	1720	4420
	ROOF OR CEILING	296	0.19	40	2960	
	FLOOR					
	INFILTRATION OR VENTILATION	940				
	GLASS					
Room 4	DOOR	39	1.60	40	240	4440
	WALL	15	0.56	40	840	
	PARTITION					
	ROOF OR CEILING	71	0.25	40	710	
	FLOOR	6 x 42 5/8	0.19		280	
Room 5	INFILTRATION OR VENTILATION	100	1.5	40	4200	1240
	GLASS					
	DOOR					
	WALL	30	0.5	40	1200	
	PARTITION					
Room 6	ROOF OR CEILING	20	0.25	40	800	1240
	FLOOR	6 x 42 5/8	0.19		280	
	INFILTRATION OR VENTILATION					
	GLASS					
	DOOR					

25X1C

HEAT LOSSES

ROOM NAME & NUMBER	PART OF STRUCTURE OR OUTSIDE AIR	NET AREA SQ. FT. OR CFM	"U" FACTOR	TEMP. DIFF. °F	HEAT LOSSES BTU/HR	ROOM TOTAL HEAT LOSSES BTU/HR
Rm 101	GLASS	13	1.13	40	2	1280
	DOOR					
	WALL	1.3	0.56	40	25	
	PARTITION					
	ROOF OR CEILING	35	0.25	40	35	
	FLOOR	21 x 42	0.18	40	82	
	INFILTRATION OR VENTILATION	40	1.88	40	175	
	GLASS					
	DOOR					
	WALL					
	PARTITION					
	ROOF OR CEILING					
	FLOOR					
	INFILTRATION OR VENTILATION					
	GLASS					
	DOOR					
	WALL					
	PARTITION					
	ROOF OR CEILING					
	FLOOR					
	INFILTRATION OR VENTILATION					
	GLASS					
	DOOR					
	WALL					
	PARTITION					
	ROOF OR CEILING					
	FLOOR					
	INFILTRATION OR VENTILATION					

25X1C

ZONE'S III HEATING ELEMENT SELECTION

ZONE'S III Heating Load : ZONE'S LOSSES + LOSSES OF
A R FOR VENTILATION

Where ZONE'S LOSSES = 29700 BTU/HR

And LOSSES OF AIR FOR VENTILATION = 1430 CFM \times 1.08 \times ($t_{in} - t_{out}$)

$t_{in} = 70^{\circ}\text{F}$

t_{out} = Air temperature in the unit's mixing box.

$$t_{out} = \frac{(6930 \times 72 + 1370 \times 30) + (8490 \times 72 + 330 \times 30) + 1180 \times 70 + 250 \times 30}{(SEE NOTE) \quad 20930 \quad + (305 \times 70 + 330 \times 30)}$$

$$= 69^{\circ}\text{F}$$

$$\text{Hence ZONE'S III HEATING LOAD} = 29700 + 1430 \times 1.08 \times (70 - 69) \\ = 31250 \text{ BTU/HR} \approx 10 \text{ kW}$$

SELECT "HIDECO" BLAST HEATING COIL 3 ϕ , 60 CPS,
208 V, STANDARD SLIP-IN HEATER 18" \times 10", TWO-STAGE
WITH THERMAL CUTOUTS AND CONTACTORS

NOTE : CFM & TEMPERATURES OF ZONES ARE SHOWN
IN "COOLING LOAD SUMMARY" SHEET

25X1C

ZONE'S IV HEATING ELEMENT SELECTION

ZONE'S IV Heating Load: ZONE'S LOSSES + LOSSES OF AIR
FOR VENTILATION

Where ZONE'S LOSSES = 32440 BTU/HR
And LOSSES OF AIR FOR VENTILATION = $3380 \text{ CFM} \times 1.08 \times (t_{\text{in}} - t_{\text{out}})$

$t_{\text{in}} = 70^\circ\text{F}$

t_{out} = air temperature in the units mixing box

or $t_{\text{out}} = t_{\text{in}}$ previous steel = 69°F

$$\begin{aligned}\text{Hence ZONE'S IV HEATING LOAD} &= 32440 + 3380 \times 1.08 \times (70 - 69) \\ &= 36090 \text{ BTU/HR} \approx 10 \text{ kW}\end{aligned}$$

SELECT "INDELCO" BLAST HEATING COIL, 3 ϕ , 60CPS,
208V, STANDARD SLIP-IN HEATER 28" x 12", TWO-STAGE
WITH THERMAL CUTOUTS AND CONTACTS

25X1C

A.C. UNIT SELECTION

GRAND TOTAL COOLING LOAD	512520	BTU/HR
TOTAL AIR REQUIRED	20930	CFM
FRESH AIR REQUIRED	1280	CFM
OUTDOOR CONDITIONS	73°F	DB
	73°F	WB
	33%	RH
INDOOR CONDITIONS (MIN)	72°F	DB
	60°F	WB
	50%	RH
AIR TEMPERATURE ENTERING THE COIL	73.5°F	DB
(from Chart)	61.2°F	WB
AIR TEMPERATURE LEAVING THE COIL	58.9°F	DB
(from Chart)	52.5°F	WB

Select CARRIER, MULTIZONE, BLOW-THRU TYPE, A.C. UNIT
with DIRECT EXPANSION COOLING COIL, R-22, MODEL
39C-135, or approved equal.

25X1C

CONDENSING UNIT SELECTION

COND UNIT CAPACITY : 512520 BTU/HR
AMBIENT TEMPERATURE : 95°F
SUCTION TEMPERATURE : 40°F

SELECT "CARRIER" 38AB064* PACKAGED CONDENSING
UNIT, AIR-COOLED

UNLOADING STAGES 6 / 100, 83, 67, 50, 33, 17%

COMPRESSOR INPUT : 65 KW
FAN MOTORS : 6x1 HP

* NOTE

Selection is based on "20% RESERVE UNIT CAPACITY OF
CONDENSER" according to source dated 16 JUL 69

26 November 1969

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BASIS OF DESIGN

ELECTRICAL

GENERAL

The design is based on 120/208-volts, 3-phase, 4-wire, 60-cycle system.

LOADS

The total utility connected and maximum demand loads of the main building are as follows:

Utility connected load: 207 KVA

Utility maximum demand load: 114 KVA

CODES

The design is based on the United States National Electrical Code and the

25X1A

WIRING SYSTEM

Wiring system complies to local practice and conforms to the U.S. and

Wiring consists of multiconductor thermoplastic insulated and sheathed cables, protected by galvanized iron pipes where mechanical protection is required.

25X1A

LIGHTING

In Room 10, the new lighting layout consists of commercial fluorescent lighting units. A 70 foot-candle illumination level is maintained. Fluorescent units have radio suppressed ballasts and are suitable for ceiling surface mounting. Recessed units have not been used in order to facilitate the installation.

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UTILITY LOAD POWER SUPPLY

The entire utility load of the main building is fed through the new utility Panel "B" and the existing underground 500 MCM power plant feeder. The new panel is dead-front safety-type and incorporates molded case circuit breakers. The main breaker of Panel "B" is 600A and serves as the utility load main disconnect.

The utility load is estimated to have a summer maximum demand of 114 KVA. In addition, this load includes a condensing unit with two 120A compressors. Although the compressors of the condensing unit do not start simultaneously and are part-winding type, it will not be possible to run the utility load with only one 100 KW generator. Therefore, it is recommended to modify the existing power plant switchgear and connection of generators for a double bus (utility bus - technical bus) system. The two buses will operate independently and it will be possible to connect each generator to either bus of the switchgear. In addition, due to the low loading conditions of the generators, it is recommended to provide one dummy load for each power plant bus.

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UTILITY LOAD ANALYSIS

THE PRESENT DEMAND KVA OF THE AIR COOLED CONDENSING UNIT ARE ESTIMATED AS FOLLOWS:

THE MAXIMUM DEMAND LOAD OF THE UNIT FOR THE DESIGN CONDITIONS IS, ACCORDING TO THE MANUFACTURER'S DATA, 65 KW. ASSUMING A POWER FACTOR OF 0.85, THE DEMAND KVA OF THE UNIT ARE $\frac{65}{0.85} = 77 \text{ KVA}$. SINCE THE UNIT HAS BEEN SELECTED WITH 20% SPARE CAPACITY, THE ACTUAL DEMAND LOAD OF THE UNIT WILL BE $77 \text{ KVA} - 20\% = 65 \text{ KVA}$

THE TOTAL CONNECTED AND MAXIMUM DEMAND UTILITY LOADS OF THE BUILDING ARE AS FOLLOWS:

LOAD TYPE	CONNECTED LOAD (KVA)	DEMAND LOAD (KVA)	DIV. FAC.		MAX DEMAND LOAD (KVA)	
			SUM.	WIN.	SUMMER	WINTER
CONDENSING UNIT	98	65	1	0.5	65	32.5
MULTI-ZONE UNIT	15.1	12	1	1	12	12
HEAT PUMP	2.4	2.4	1	1	2.4	2.4
DUCT HEATERS	20	20	0	1	—	20
CHRYSLER UNIT	12*	10*	—	—	—	—
CARRIER UNIT	15*	12*	—	—	—	—
EXISTING LOADS	45*	35*	1	1	35	35
TOTALS	207.5				114.4	101.9

* ESTIMATED LOADS BASED ON UNIT RATINGS AND PANEL 'B' READINGS

MAX DEMAND LOAD (SUMMER) = 114.4 KVA

25X1C

$$\text{FUTURE MAX DEMAND LOAD} = 114.4 + 20\% \text{ of } 114.4 = \\ = 114.4 + 23 = 137.4 \text{ KVA}$$

SELECTION OF PANEL "B" MAIN C.B.

$$I = \frac{137.400}{\sqrt{3} \times 208} = 380 \text{ A}$$

I_N OF EACH COMPRESSOR MOTOR = 120 A
 $380 \text{ A} + \text{INRUSH CURRENT OF THE ONE COMPRESSOR MOTOR (1.0 } I_N) = 380 + 120 = 500 \text{ A}$

SELECTED 600 A MAIN C.B.

CHECKING OF FEEDER TO UTILITY PANEL "B"

$$I = 380 \text{ A} + 25\% \text{ OF } I_N = 380 + 30 = 410 \text{ A}$$

CAPACITY OF EXISTING $3 \times 500 \text{ MCM}$ FEEDER FOR TWO SINGLE-CONDUCTOR FEEDERS IN DUCT BANK WITH 20°C SOIL TEMPERATURE, 60°C CUPPER TEMPERATURE AND 75% LOADING FACTOR IS 427 A

HENCE EXISTING FEEDER IS O.K

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Dear Sir:

In accordance with the Scope of Work of our contract we are forwarding herewith three (3) copies of the following documents:

A. List of prospective bidders.

B. Contract documents -

1. Invitation for Bids
2. Contract Agreement
3. Bid Form
4. General Provisions
5. List of Drawings
6. Technical Specifications

C. Construction Cost Estimate

D. Specifications and Cost Estimate for Panelboard "B" which should be procured and installed by the using agency (see attached Conference Notes of 30 Jul 69).

E. Design analyses

F. Drawings

In connection with this submittal please note that:

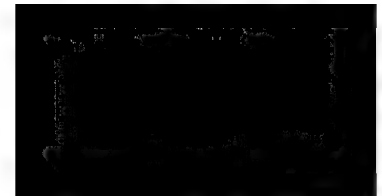
1. The prospective bidders were not given details as to the location and nature of this project. We will contact the prospective bidders again for further details upon receipt of your approval.

2. Contract documents should be reviewed and one (1) copy returned annotated with your comments and information which should be completed by your office.

3. Procurement specification for Panelboard "B" should be reviewed and, in the event this panelboard is approved, action for its purchase should be initiated as soon as possible should your office desire installation of this panel prior to contractor's presence at the site.

If your office requires additional information and/or clarification on the submitted documents, we suggest a meeting be held and we will be awaiting your instructions.

Sincerely yours,

A rectangular area of the document has been completely blacked out, obscuring the signature of the Executive Vice President.

Executive Vice President

25X1A

Enclosures
As stated

25X1C

ELECTRICAL

25X1A

1. [REDACTED] clarified existing feeder sizes -

Technical Feeder to Panel "A": 6 x 500 MCM + 2 #2/0 AWG
Utility Feeder to Panel "B": 4 #1/0 AWG

These feeders are underground installed in conduit.

25X1A

25X1A

2. Reference Paragraph 1.A.4.c.2 of [REDACTED] memorandum dated 16 Jul 69 (subject [REDACTED] letter 19 Jun 69), it was decided that rearrangement of feeders and installation and connection of new Panel "B" will be done by the Using Agency. [REDACTED] shall provide a sketch showing proposed installation methods.

25X1A

25X1A

3. New Panel "B" will be Government furnished and [REDACTED] will prepare procurement documents giving catalogue numbers of three manufacturers.

25X1A

[REDACTED] asked for the new Panel "B" to have the required breakers for the existing and new air-conditioning loads plus nine (9) 3P-50A and two (2) 3P-100A breakers to be used for connection of existing loads (seven ((7)) 3P-50A and ((1)) 3P-100A are presently utilized - existing Panel "B") and as spares.

4. New feeders from new Panel "B" to existing and new A/c equipment shall be run on the roof since it will be very difficult to install feeders along the walls and over communication equipment.

5. Reference above Paragraphs 2 and 3, [REDACTED] drawings will show the new Panel "B" as existing and connected to an existing 3 x 500 MCM + #1/0 AWG feeder.

25X1A

6. Existing feeder to existing A/C units will be disconnected and abandoned.



25X1A

MEMORANDUM FOR THE RECORD

25X1C SUBJECT: Air Conditioning [REDACTED] - Visit to the Site on 26 Sep 69

25X1A
25X1C [REDACTED] visited the Site on 26 Sep 69
and conferred with representatives [REDACTED] on Subject project.

25X1A
25X1A On this occasion copies of the electrical sketch ESK-2 for the
installation and connection of Panel " B ", (reference conference
notes paragraph 2) were given to [REDACTED] Also an additional
copy was given to [REDACTED] at a later date during his visit to
our office.

Enclosure:
ESK-2

PB/vv

[REDACTED] 25X1A

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